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MOTER WORLd

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THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 1

New York, March 28, 1912

Ten cents a copy
Two dollars a year

547004

THE 1912

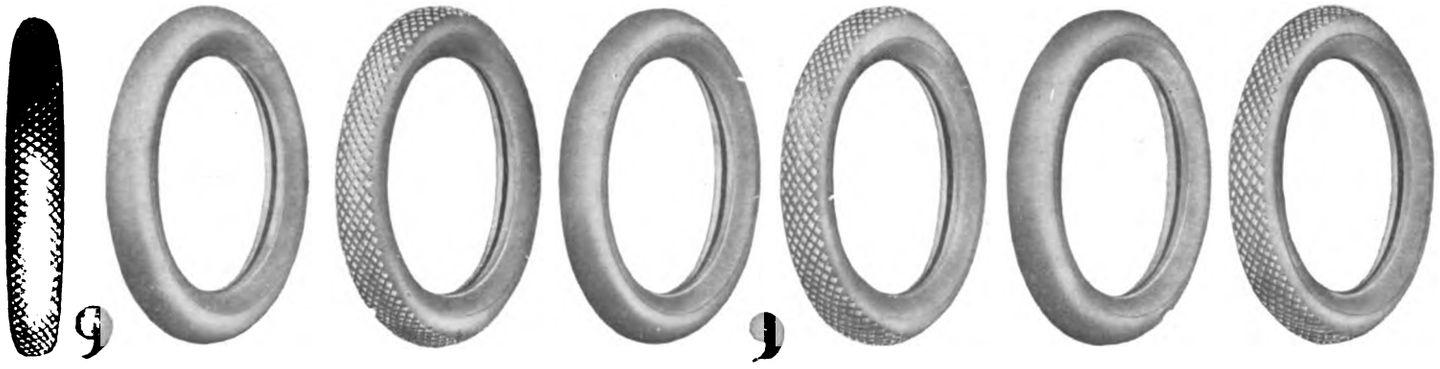
Pierce-Arrow

TOURING CAR

is a delight to the eye in body designing. The last link that connected the automobile body with coach building has been severed, and the PIERCE-ARROW *has a body growing out of its natural needs as an automobile.*

The Pierce-Arrow Motor Car Co., Buffalo

Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York



No-Rim-Cut Tires—10% Oversize Touch the Million Mark

This month we celebrate. A million Goodyear Auto Tires have now gone into use.

Over half that million have been sold within the past 12 months. Yet this is our 13th year.

Think what that means. More sold in this last year alone than in 12 years put together.

Just because No-Rim-Cut Tires—our patented type—suddenly became the sensation.

A few men proved them out. Then thousands proved them—then tens of thousands more.

Now a million tires. Now a trebled demand over last year. Now a larger sale than any other tire commands.

All this occurs after these tires have been tested on some 200,000 cars.

The Reign of the New Type Tire

Now comes the reign of a new-type tire—a tire that cuts tire bills in two.

A tire that can't rim-cut—an oversize tire, to save the blowouts due to overloading.

A hookless tire—one that needs no tire bolts, nor hooking to the rim.

And a tire which embodies the final results of our 13 years spent in perfecting tires.

All these features combined in a tire which costs no more than other standard tires.

That will explain this overwhelming demand for Goodyear No-Rim-Cut tires.

Old-Type Tires Must Go

Old-type tires—clincher tires—rim-cut when partly deflated. When they run flat, because of a puncture, a minute's time may wreck them.

Statistics show that 23% of all ruined clincher tires have been rim-cut.

Now comes a type which makes rim-cutting impossible. And all of you motorists are sometime bound to adopt them.

These same tires—No-Rim-Cut tires—are made 10% oversize. The hookless base permits that.

That means 10% more air—10% greater carrying capacity—without any extra cost.

It means support for your extras, and for passengers who overweigh. It reduces the danger of blowouts.

That 10% oversize, under average conditions, adds 25% to the tire mileage.

All those advantages at the price of tires which lack them. How long will any man cling, in your estimation, to old-type, skimpy tires?

The Secret

The secret of this new-type tire lies in three flat bands of 126 braided wires.

These braided wires are vulcanized into the tire base. Thus the tire base is made unstretchable.

This tire needs no beads to hook into the rim flange, because nothing can force the tire over the flange.

But, unlock the flange and the tire slips off like any quick-detachable tire. It slips off much easier, because no beads can get "frozen" into the rim flange.

With this hookless tire, your removable rim flanges are slipped to the opposite sides. Then they curve outward instead of inward.

Instead of a curved flange digging into the tire there is a rounded edge on which the tire rests if deflated.

There is no changing of rims if your rims are standard. Nearly all rims are now made to fit these tires.

We Control It

This braided wire feature forms the only way to make a practical tire of this type. The reasons are explained in our Tire Book.

Competition, of course, has forced other makers to attempt this hookless tire. But the essential feature is controlled by our patents. And substitute features have proved unsatisfactory. Many have been abandoned.

This new-type tire, if you want it right, means the Goodyear No-Rim-Cut tire. That is why the demand, in a flood-like way, has centered on this tire.

Get the proved-out tire when you get this type. Get the tire which outsells all the rest after a million have gone into use.

Our 1912 Tire Book—based on 13 years spent in tire-making—is filled with facts you should know. Ask us to mail it to you.

GOODYEAR

No-Rim-Cut Tires

With or Without Non-Skid Treads

THE GOODYEAR TIRE & RUBBER COMPANY, Arthur St., Akron, Ohio

Branches and Agencies in 103 Principal Cities

Main Canadian Office, Toronto, Ont.

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Canadian Factory, Bowmanville, Ont.

(512)

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Letter No. 8

Manufacturers and Dealers Motor Fire Insurance Company
(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

1402 North American Building
Philadelphia

March 28th, 1912.

Messrs. MANUFACTURER, DEALER and COMPANY,
Every City, Everywhere.

Gentlemen--

QUALITY SERVICE--WHAT DOES IT MEAN TO YOU IN YOUR BUSINESS?

IT MEANS something more than delivering to your customer a satisfactory car.

IT MEANS that you are at all times prepared to render your customer such service as will eliminate all possible annoyance which he might experience through the ownership of this car.

IT MEANS that you must be able to advise him about any accessories which he may want--furnish them if he so desires; in fact, be his advisor in all things pertaining to his car and GIVE HIM SUCH ADVICE AS TO INSPIRE HIS CONFIDENCE IN YOU, and thereby HOLD HIM AS A CUSTOMER for all time.

ARE YOU EQUIPPED to advise your customer, authoritively, with reference to some form of insurance and feel assured that your advice will not return to plague you?

ARE YOU EQUIPPED to arrange for this insurance should your customer request you to attend to it for him?

WRITE US.

Yours very truly,

ORGANIZATION COMMITTEE,
By Ernest H. Greenwood, Secretary.

P. S. Look for letter number 4 on this page next week.

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MAY WE HAVE YOUR LAYOUT

Of Bearing Installation?

¶ We can save you money, time and trouble—in other words, show you a short cut to satisfactory bearing installation.

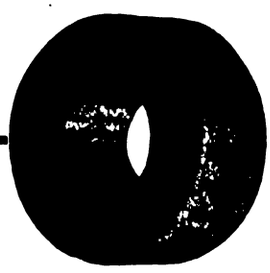
¶ The successful use of New Departures in 60% of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established.

¶ This fact also constitutes a good reason why you should send us your layout and give our engineering and sales departments an opportunity to place our proposition squarely before you.

¶ Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service.

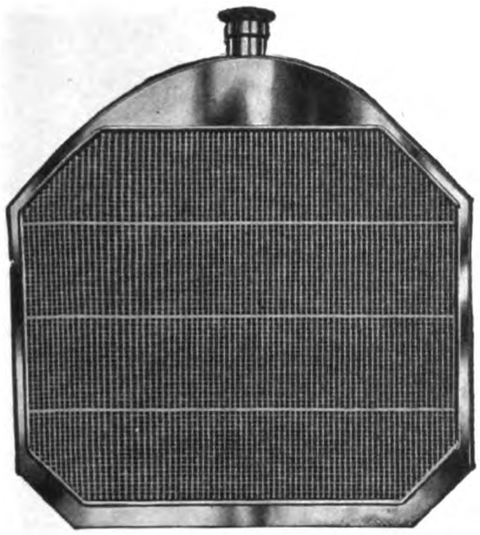
The New Departure Mfg. Company

BRISTOL, CONN.



1016 Ford Bldg. DETROIT, MICH.

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The Mayo—the radiator thoroughbred

¶ Mayo—that radiator which stands the test and inspection of the most critical. Mayo Quality is necessary to complete the equipment of the Quality Car.

¶ Most of the best known cars embody Mayo Radiators. This fact alone should be sufficient to convince you that Mayo is absolutely the best.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

Miller's Pan-American TIRE SAVER



WHAT IT DOES:

Repairs Punctured Inner Tubes. Fills Cuts in Tire Casings, and Repairs Blow-Outs Without Vulcanizing. Increases Tire Mileage.

Consists as illustrated above of:
One Can Pan-American Rubber Cement.
One Can Pan-American Rubber Putty.
One Pan-American Tire Plaster.
One Piece High Grade Emery Cloth.
Packed in neat screw top Carton.

Price, Complete with Directions $1.00

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES
"The Pioneer"—Established 1896

Chas. E. Miller

MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

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ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

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NEWARK, N. J.—274 Halsey St.
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THE MOST DIRECT WAY

TO REDUCE YOUR TIRE TROUBLE IS TO USE

Absolutely Universal

THE FEATURE that makes this rim universal is the fact that the side rings are reversible so as to accommodate either straight side or clincher tires.

The rim is demountable. Two turns of a nut locks or unlocks it. It is quick detachable, aside from its demountable feature.

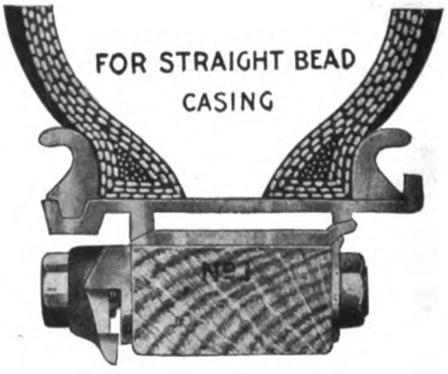
The Car Manufacturer is not limited in the sale of his car on account of types of tires when using STANDARD UNIVERSAL RIMS—all tires fit these rims.

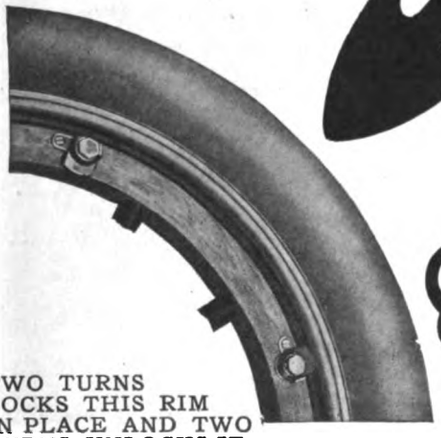
The Car Owner has an unlimited market from which to select his tires.

The Tire Maker is not handicapped in his sales—all tires fit STANDARD UNIVERSAL RIMS.

Send for our catalogue No. 607 explaining quick detachable and demountable rims.







TWO TURNS LOCKS THIS RIM IN PLACE AND TWO TURNS UNLOCKS IT FOR DEMOUNTING

Standard UNIVERSAL RIMS

THE UNITED RIM Co. AKRON O.

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Economical in Current Consumption

THE TUTO Horn with its patented "two-tone" feature and one-button control is acknowledged the most adequate signal for the modern motor car.

¶ The completeness and neatness of the TUTO Horn mounting equipment has stamped this device as superior to all other warning signals, in its adaptability to all makes of cars.

¶ The protection of the wiring and the locking of the operating parts from working loose make the TUTO Horn positive in operation and entirely dependable.

¶ The electrical energy required for operating the TUTO Horn is so small as to be practically negligible—less than one ampere on the low note and below two amperes on the high note. Under average conditions, the low note is used 90 per cent of the time, so that the TUTO Horn is without question, the most economical electrical warning device marketed.

¶ Low current consumption is absolutely essential for any warning signal which is used for standard equipment in the place of the bulb horn. The TUTO displaces both the bulb and the single-tone-loud electric horns, thus it is used constantly where all other types of electrical warning signals are used only occasionally as a supplement to the bulb horn.

¶ Yet with this constant use, the TUTO Horn will operate from four months to a full season on one set of five standard No. 6 dry cells, or from one to two months on one charge of a small ignition storage battery.

¶ The TUTO Horn, furthermore, can be operated from any six volt lighting or starting battery with equal economy.

¶ In comparison with other electrical warning signals, the one-loud-note-type, the TUTO requires from 1-2 to 1-12 as much energy for its operation. In other words, the battery will last from two to twelve times as long.

¶ This low current consumption is another vital reason for the adoption of the TUTO Horn as standard equipment on all motor cars.

The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quali.y's seen."

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GOING SOME

A nigger met a ghost on the road and it chased him. The darkey ran till he was out of breath and then flopped down to rest. "We were sure going some," said the ghost. "Hungh — dat ain't nothin' side o' what we're goin' to go when ah gets mah breff," replied the terrified darkey.

The *Stewart Speedometer* has been "*going some.*" Its only *real* competitor has been its own shadow. We have given the world the *best* speedometer that could be made and sold it for the price of the *least;* but the past performances of the *Stewart Speedometer* won't have a "*ghost*" of a show with its *future.*

Money can't *make* the Stewart better; and money can't *buy* the Stewart's *better.* The price is *little* because the output's *big.*

Built the *strongest* — lasts the *longest.*

On *four* cars out of five, and—"*We're about to go sum mo'.*"



Speedometers, $15 to $30
Clock Combinations, $45 to $70

Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial—large figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft—drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB."

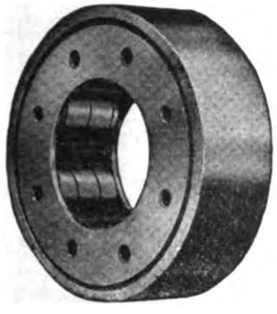
STEWART & CLARK MANUFACTURING COMPANY

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit Minneapolis Chicago Los Angeles Boston Cleveland New York San Francisco Kansas City London Philadelphia Paris Indianapolis

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"When I Bought My Car"

"One of the first mechanical details I looked into was the bearings," an owner was heard to remark recently to a friend who was in the market.

"The car I owned had Hyatt Roller Bearings in the rear axle where the hardest strains and jolts are received. I drove that car over one hundred thousand miles in three years and never even saw the bearings."

"Screw down the grease cups once in a while, so that there is ample lubrication, and your car will run on Hyatt's for years."

Hyatt Roller Bearings afford a line contact and because of their flexible principle, give a perfect bearing surface. Specifications show Hyatt's in 91 out of 100 cars built in America this year.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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Unquestionably there is a big advantage in a dealer being able to say to his customers—

I am going to sell, this year, tires made as no other tires in the world are made and they will cost you no more than you are asked to pay for other kinds.

I have arranged with four of the world's leading tire factories to build me a tire for your use that actually combines every element of strength and every secret of manufacture known to the four factories.

In these four immense, completely equipped plants there are at work for me today four corps of tire specialists each of which formerly made a brand of tires which ranked among the world's best tires—Continental, G & J, Hartford and Morgan & Wright.

These experts have combined all their skill, all their knowledge, all their tire building experience to produce one uniformly superior brand of tires—UNITED STATES TIRES, in every one of which there is the Strength of Four.

The United States Tire line is a big one. It includes the three most popular and reliable styles of fastening—Quick Detachable, Dunlop (straight side) and Clincher—and six styles of tread.

These are the tires I am handling this season. Why not try them?

Tire-by Satisfied thank you

UNITED STATES TIRES ARE GOOD TIRES

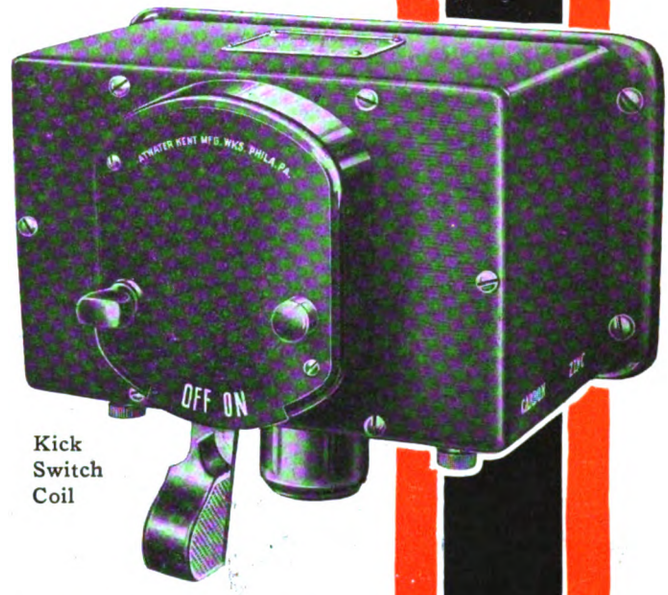
UNITED STATES TIRE COMPANY

New York

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The Atwater Kent Ignition System

YOU might be excused for wasting batteries and littering up your car with fussy ignition equipment, if to do so contributed to the better running of your car or to your comfort and peace of mind.



Kick Switch Coil

But when you accept a vibrator coil and timer outfit or a cheap magneto on your new car instead of an Atwater Kent System, you are doing more than running up a bill for battery renewal and charging. You are saddling yourself with a train of small worries and uncertainties, delays for tinkering and necessity for renewals, all of which *were* a part of the game a few years ago, but which are unnecessary now.



The automobile of the future will have an ignition system as reliable as any other part of the car. Most of them will use the Atwater Kent System.

Perhaps an Atwater Kent outfit is all that is needed to make that old car run better than new.

Write today for booklet "D"

Atwater Kent Mfg. Works

46 N. Sixth St., Philadelphia, Pa., U. S. A.

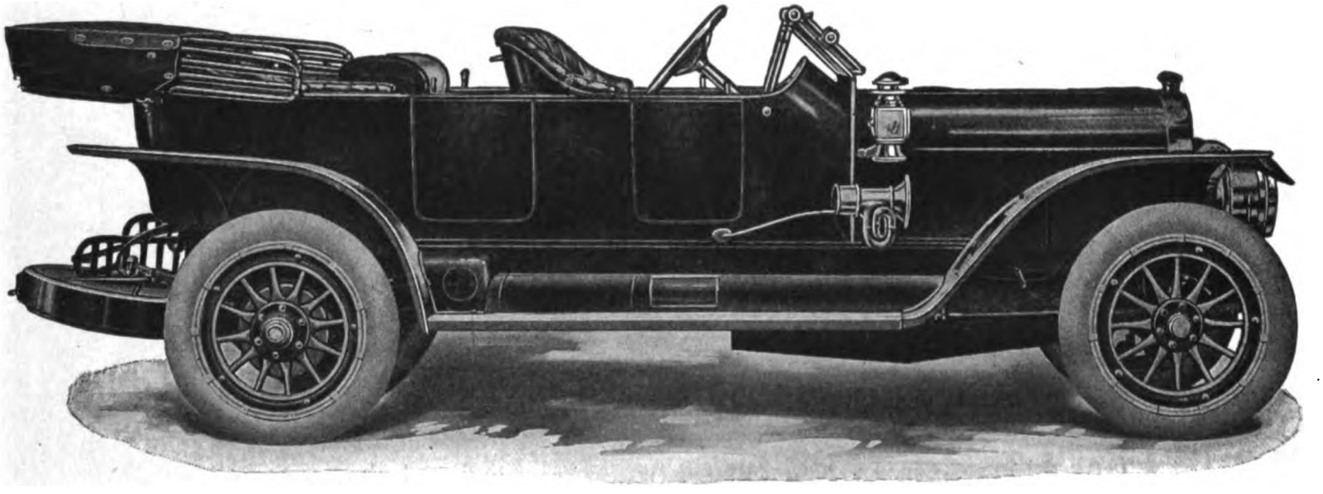
NEW YORK.....E. J. Edmond Co.
BOSTON.....F. R. Parker Spec. Co.
CHICAGO.....Motor Car Supply Co.
SAN FRANCISCO, Chanslor & Lyon M. S. Co., Weinstock-Nichols Co.
MILWAUKEE....Julius Andrae & Sons
OMAHA.....Omaha Rubber Co.
CHATTANOOGA.....Sanford Bros.
DALLAS.....Fisk Co. of Texas

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Knox

AND

Absolute Motor Satisfaction Are Synonymous



Knox Model "S" 6-Cylinder Torpedo

"Passes Them All"

On the road — Up the hill
In flexibility — In silence
In power — In speed
In equipment — In fluish

AND

The Price is Right

Send for Catalog — Ask for a Demonstration

KNOX AUTOMOBILE CO., Springfield, Mass.

BRANCHES: New York, Chicago

"All Knox Pleasure Cars Are Sold Completely Equipped"

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Knox

COMMERCIAL VEHICLES

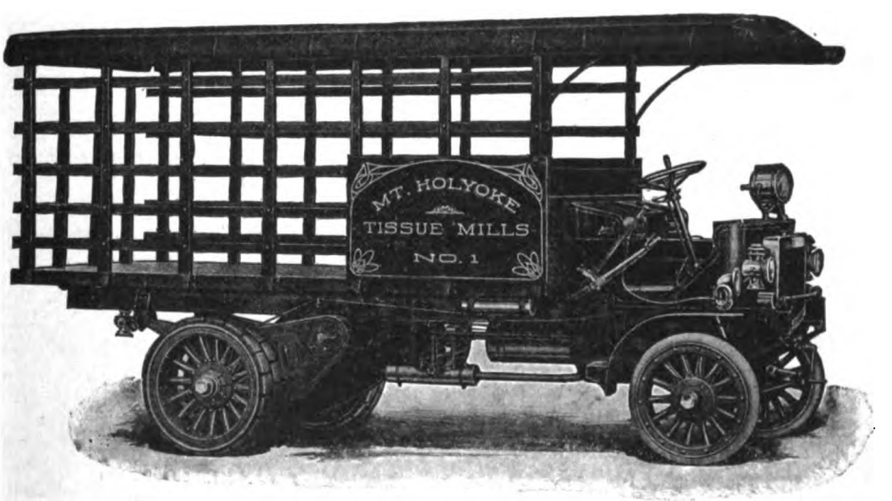
have been recognized as the highest standard of motor truck design and construction ever since the beginning of the industry.

They have formed the basis of comparison and imitation for the small army of concerns who have put motor trucks on the market in recent years.

WHY?

There is but one reason. They have stood the test of service in practically every field of industrial transportation.

They Have Made Good



KNOX AUTOMOBILE CO., Springfield, Mass.

BRANCHES: New York, Chicago

Send for Catalog. We Have Some Desirable Territory Open for Responsible Dealers.

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Dealers—Here is the 100% Efficient Self-Starter You Can Install on Every Car in Your Territory—READ THE REASONS

Retail Price $20. Your Profit Most Liberal

PRACTICALLY every car owner in your territory wants a self starter, but heretofore prices have been too high, installation too difficult and unreliability most pronounced. Here are reasons why you can change this condition into one approximating cold cash for you.

FIRST REASON—The Crankless Self Starter equals the best high-priced device—is more efficient than the ordinary contrivance and starts the engine 100 times out of a hundred by simple foot pressure.

SECOND REASON—**There isn't a car owner, cranking by hand, who will not welcome your suggestion to equip his car with the simplest self starter on the market at a price he can afford to pay—that price is $20.00.**

THIRD REASON—You, Mr. Dealer, or even your customer, can attach the Crankless Self Starter—easily—quickly.

FOURTH REASON—Every Crankless Self Starter you install will be a traveling advertisement for you—it will sell others—we guarantee this.

FIFTH REASON—We have a proposition that is good enough to make you want to join us in the work of putting the best and most dependable starter on several hundred thousand cars that ought to have them.

Fill out the corner coupon and we will return you a money-making proposition—one you can turn into quick, profitable action.

GET IN BEFORE YOUR TERRITORY IS INVADED

Cox Brass Mfg. Company

ESTABLISHED, 1872

ALBANY, NEW YORK

Pearl & Van Woert Sts., Albany, N. Y.
1777 Broadway, New York City
899 Boylston Stheet, Boston, Mass.
870 Woodward Avenue, Detroit, Mich.



Press the Button With Your Foot Thats All

COX
BRASS MFG. CO.,
Albany, N. Y.

Send full description of the Crankless Self Starter —also your agency proposition.

.....

.....

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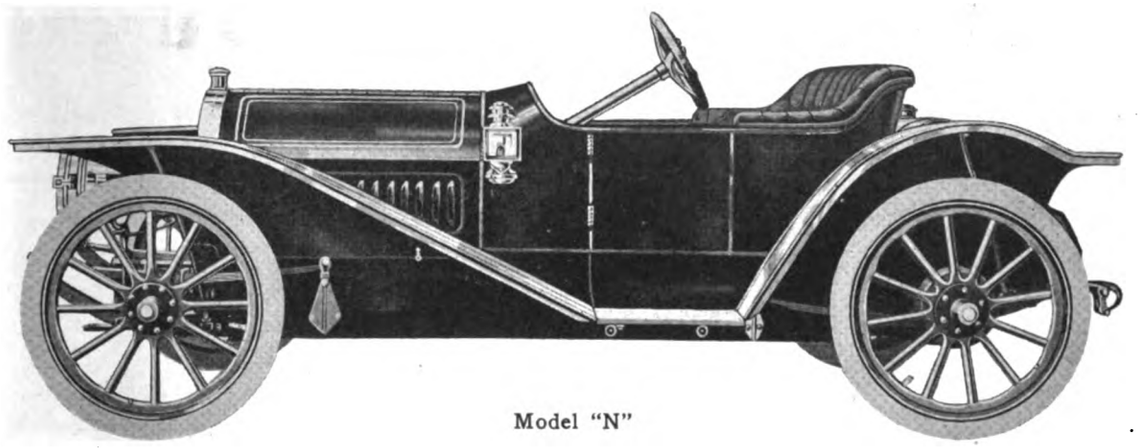
(Motor World)

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The Car the Public Wants

Versus

The Difficult Car to Sell



Model "N"

The Regal "25" Underslung Roadster $900

THERE ARE A LARGE NUMBER OF DEALERS—dealers whose selling abilities are unquestioned, who are not doing the maximum amount of business they are capable of doing, for one very important reason—they waste their energies upon difficult cars to sell. By that, we mean, they represent cars that have not enough distinction in quality, price or design to easily beat competition.

THE PUBLIC is very critical. People are educated in motor car values. They have fancies and we might say, educated prejudices. It is absolutely certain, any car today that wins public confidence, so that it outsells all others in its particular field, must have a certain distinct quality, superiority, call it what you will, as a reason for its pre-eminence.

THE REGAL "25" UNDERSLUNG ROADSTER is one of the select number of cars the public wants. Thousands have been sold because this car **has** that distinctive quality, that superiority which results from advanced engineering construction. This car has, in fact, **outsold** all other Roadsters because of these inbuilt values and because it is marketed at a moderate price.

SUPPOSE A DEALER HAS TEN PROSPECTIVE BUYERS, to whom he thinks he could sell Roadsters. But, suppose the manufacturer of the particular car he represents does not specialize (very few do) but builds Roadster bodies upon Touring Car chasses, is it not a difficult matter to convince each and every one of those ten possible purchasers that this makeshift Model is the car he wants? Seven out of those ten purchasers will know that the ideal Roadster must be designed and built a Roadster from the ground up.

THE EASY CAR TO SELL is the car that most closely approaches perfection. We affirm this Regal "Underslung" Roadster to be not only as near perfect a Roadster as is possible to build, but, owing to its "Underslung" construction to be superior in design to any Roadster built the ordinary way. "Underslung" construction gives it that distinctive beautiful appearance, that comfortable look, despite the raciness and suggestive power in its lines, making this car the biggest seller of its class in the country.

THE COMPREHENSIVE REGAL LINE is an answerable business argument to any dealer who is abreast of the times—who studies public preference—who does not waste the powers of his organization selling cars that are difficult to sell. There is a Regal Model to suit every taste, to meet every demand for moderate priced cars. What is more to the point, they are **"Underslungs"** with all the advantages of "Safety," "Economy," and "Comfort," this advanced construction implies. Our enormous and growing business proves they are easy to sell, because they are the cars the public wants.

SOME "UNDERSLUNG" ROADSTER SPECIFICATIONS—Motor 25-H. P.; 3¾ x 4½; Wheel Base 100 inches; Magneto and Batteries (dual ignition); Transmission (Selective) Hyatt Roller Bearings throughout Transmission and Axle; Three speeds forward, one reverse; Morgan & Wright Tires, 32 x 3½; Standard Equipment; five lamps; Generator; Horn; Complete Tool Equipment; (Folding Glass Windshield and Mohair Top and Top Boot $50 extra.)

OTHER REGAL "UNDERSLUNGS"—Regal "25" Underslung Touring Car $950. (The talk of the New York and Chicago Shows.) The Famous Regal "25" Underslung Colonial Coupe $1250. The Regal "35" "Underslung" Touring Car $1400.

The Regal Motor Car Co. Automobile Manufacturers Detroit, Mich.

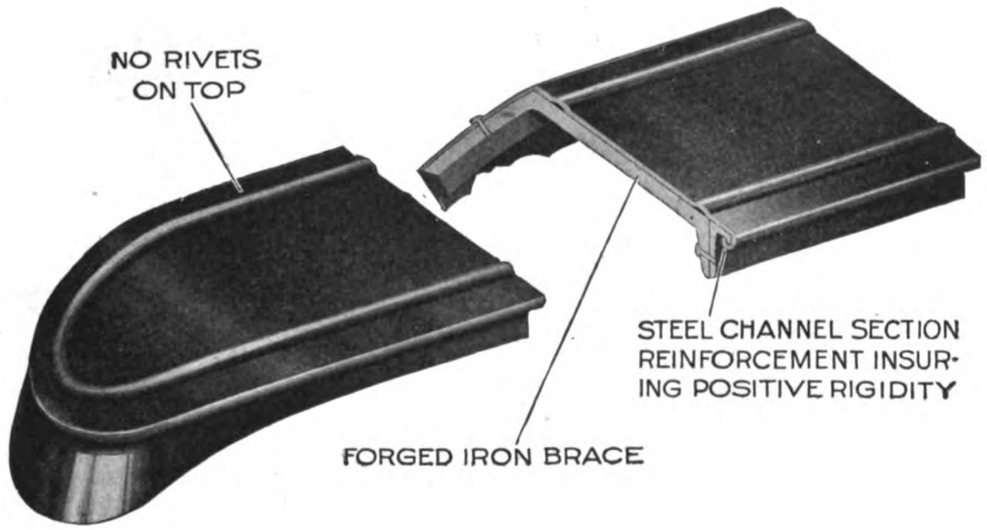
SOME REGAL WAREHOUSES:

BOSTON, 50 Washington St., Brookline.
BUFFALO, 249 Delaware Ave.
CHICAGO, 1502 Michigan Ave.
DALLAS, 304-6 N. Akard St.
KANSAS CITY, Franklin Hudson Ptg. Bldg., 22d & Oak Sts.
MINNEAPOLIS, 1400 Hennepin Ave.
NEW YORK, 136-46 West 52nd St., Randall Bldg.
OMAHA, 2209 Farnum St.
SAN FRANCISCO, 720 Harrison St.

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Do You Know What the Hayes Service Will Do For You?

We are the largest sheet metal users in the world. Our factories, making all-metal automobile bodies, wood-metal bodies, fenders, aprons, dashes, shrouds, running boards, hoods, gasoline tanks, battery boxes, tool boxes, etc., are equipped to extend the most valuable service that the automobile maker can enlist.



Hayes Fender of Latest Design

Our engineers are ready at all times to give you valuable advice on bodies or fenders. They will go over your blueprints with you, suggest and advise and in every way help your designers to a better solution of some of your producing problems. Our new equipment, which is only just completed, enables us to do more toward putting cars through an automobile factory in quick time than any service we know of. We are prepared to take the entire sheet metal proposition off the makers' hands at a saving of money, and better still, to the prevention of the wrath of automobile dealers who during the rush season are demanding delivery of cars. We fit fenders, aprons, dashes, shrouds, running boards, right to your chassis, so when you receive them in your factory there is no time whatever lost in assembling these parts.

To the fenders we fit fender irons, which minimize vibration and rattle.

We guarantee every department of the Hayes service, the same as we guarantee Hayes materials. The Hayes standard is inflexible. The Hayes service is complete. Help your factory production by taking advantage of our new and wonderful facilities. Let us make you a sample set of parts for your car from your blueprints.

Let us prove to you what the Hayes service will do for your business.

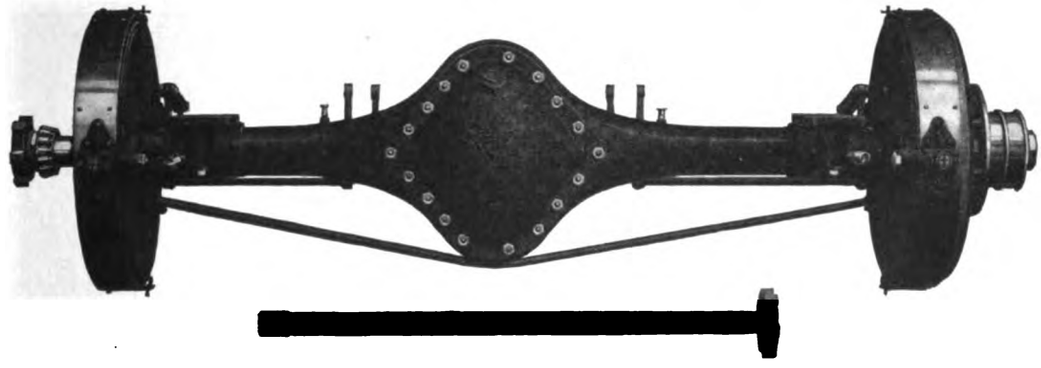
HAYES MANUFACTURING COMPANY

HAYES MFG. CO. HAYES DETROIT, MICH.

DETROIT, MICHIGAN

MANUFACTURERS OF EVERYTHING IN SHEET METAL FOR THE AUTOMOBILE—BODIES, FENDERS, TOOL AND BATTERY BOXES, GASOLINE TANKS, DASHES, SHROUDS, HOODS, RUNNING BOARDS, SHIELDS, MUFFLERS, ETC.

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The Human Equation In Good Axle Building

It takes 3633 separate operations to make a Timken-Detroit Rear Axle for pleasure cars—588 operations to make a front axle for pleasure cars.

A majority of these operations require accuracy within half a thousandth part of an inch.

The great Timken-Detroit plant is equipped with the latest automatic machinery and the most accurate jigs, tools, gauges and measuring instruments. As far as can be done the possibility of human error is eliminated in the making of the parts. That is Timken policy.

But it never will be possible to entirely, or even really very largely, eliminate the human equation from the manufacture of a complex article such as the rear axle of an automobile. The wonderfully exact machines must be set *by men*. The parts must be inspected after each operation, *by men*. The completely assembled axle must be tested *by men*.

It all comes right down to the man-stuff of the organization.

It is demonstrated fact, not mere theory, that there is a limit to the number of new men who can be "absorbed" into the Timken-Detroit Organization. Men who can get the Timken Spirit.

And it is demonstrated fact that the Spirit is even more necessary to the production of Quality than are machinery, tools, material and capital.

The Timken-Detroit Axle Company

Detroit, Michigan, U. S. A.

The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings

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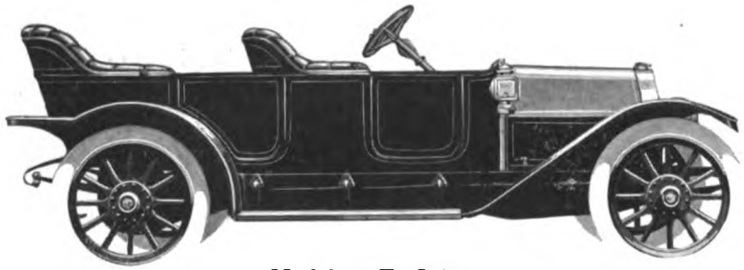
Overland

OUR MODEL 60 is a thirty-five horsepower, 5-passenger touring car. It is priced at $1200. Have you ever seen a car of this type for much less than $1500?

There are more Overland cars being bought today than any other similar car in the world.

This great success must be due to the fact that we are giving more car for less money than any other maker in the business. Compare our cars with anything else on the market and you will quickly realize where you can get the most in an automobile for the least amount of money. Write for a catalogue. Ask for book I-43.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

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COLBYS GET BACK THEIR COMPANY

Deal With Ten-Million-Dollar Implement Company is Unexpectedly Dissolved—W. M. Colby Resumes Presidency.

Despite the official announcement made in December last that interests identified with the Western Implement & Motor Co., of Davenport, Ia., had acquired the controlling interest in the Colby Motor Co., of Mason City, Ia., it transpires that the transaction was not so closely knit as to prevent its easy dissolution, and hitches or friction which developed have served to bring about such a state of affairs. By mutual consent the deal has been declared off and the new officers who were elected in December have retired and the Colby interests returned to full control of the company bearing their name. Following this action, William M. Colby was elected president; James A. Colby, vice-president, and H. S. Murphy, secretary-treasurer and general manager.

William M. Colby was the original head of the company, but in December last he retired in favor of J. E. Burmeister, who is treasurer of the Western Implement & Motor Co. At the same time, W. N. Smith and H. S. Murphy, sales managers for the Implement company were made secretary and treasurer, respectively, of the Colby organization. With the abandonment of the transaction of December first, Smith, like Burmeister, has retired from the Colby company, but Murphy remains and with enlarged power.

The Western Implement & Motor Co. is the possessor of a Delaware charter and has an authorized capital of $10,000,000, equally divided into common and preferred. Within the last three months it has been offering for sale $1,000,000 of its preferred shares, and giving as a bonus a half share of common with each preferred share.

The company has outlined for itself some ambitious and far-reaching plans, which included even the establishment of a model manufacturing village, which was to be named Appleby, after one of its promoters.

Ohio Cars to Be Built in Canada.

Negotiations which have been progress for some time with the Board of Trade of Colborne, Ont., looking to the establishment by the Ohio Motor Car Co., of Cincinnati, of a Canadian plant, finally have been consummated and the Canadian company is in process of organization. It will be incorporated with $400,000 capital, of which $250,000 will be common stock and $150,000 preferred. The factory, of course, will be located in Colborne, which is situated on Lake Ontario, 84 miles east of Toronto. Charles F. Pratt, president and general manager of the parent company, will have an active part in the management of the Canadian project. Plans for its factory building already have been completed and work, it is stated, will be started immediately.

Palmer Joins the Chevrolet Company.

R. A. Palmer, who resigned the general management of the Cartercar Co. some months ago, ostensibly to become associated with the Savings and Loan Association, of Detroit, of which he is an officer, has become identified with the Chevrolet Motor Car Co., which is one of W. C. Durant's projects. For the present, Palmer will not state what position he will hold or what are his intentions or the intentions of the company. "Just say that I have joined the Chevrolet company," is the substance of his response to all inquiries.

Elmendorf Heads New Michigan Company.

The Manistee Auto Co. has been organized in the Michigan city of that name to manufacture a low-priced runabout and a light delivery wagon. Charles Elmendorf is president and general manager of the enterprise, which is capitalized at $51,000, and George N. Burr, is secretary-treasurer. The company has acquired a disused factory building at River and Fifth streets, in Manistee, and is making ready to install the necessary machinery, which already has been purchased.

PARTING OF COLE AND HENDERSON

Correlated Manufacturing and Sales Companies to Go Separate Ways—One Henderson Will Build Cars.

On July 1, according to good authority, the intimate relations which exist between the Cole Motor Car Co. and the Henderson Motor Sales Co., of Indianapolis, whereby the latter markets the entire output of Cole cars, will be terminated.

At the same time, according to the same authority, the Henderson brothers, Chas. P. and R. P., president and vice-president, respectively, of the Henderson company, will go separate ways, which, however, will not bring them into serious conflict. Chas. P. Henderson will become general sales manager for the Cole Motor Car Co., while R. P. Henderson will head a new organization, which probably willl be styled the Henderson Motor Car Co., and which will produce a car of its own, entitled the Henderson. There will be no Cole money whatever in the new Henderson company, nor will Charles P. Henderson have any interest whatsoever in it.

When R. P. Henderson was asked by a Motor World man whether this information was correct, he said that at this time he cared to say nothing whatsoever concerning the matter. He refused either to deny or confirm the reports.

"On Friday of this week," he added, "an official statement will be issued which will fully explain matters; until that time I must be excused from saying anything."

The new Henderson car will not be a direct competitor of the Cole; nor will it be ready for the market until very late in the season. Probably it will not make its official debut until shortly before the New York show in January. That it will sell for a lower price than the Cole is certain, however. In fact, the desire for a lower priced model and one which will net the R. P. Henderson interests, at least, a better profit than it has obtained under the pres-

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ent arrangement, appears to have been one of the causes, if not the chief cause, leading up to the present state of affairs.

Just where the new Henderson company will locate is not certain, but there is every likelihood that it will find a home in Indianapolis. It will sell its product direct through its own staff and not through the Cole agents. Chester S. Ricker probably will be chief of the engineering department.

Already there has been a slight shake-up in the staff of the Henderson Motor Sales Co., whereby Homer McKee will, on April 1st, become advertising manager, while H. C. Bradfield will continue in charge of the publicity bureau.

Electrics Merged But Details Lacking.

Concurrent with the filing of papers certifying to the dissolution of the Buffalo Electric Carriage Co., of Buffalo, N. Y., late last week there was incorporated, under the laws of New York, the Buffalo Electric Vehicle Co capitalized at $1,000,000, the dissolution and the incorporation having a direct bearing on each other. It is stated that the new million dollar corporation represents a merger of five Buffalo concerns which will engage in the manufacture of electric vehicles of all types, but all efforts to discover the identity of the five concerns were discouraged and brought no result. According to the papers filed, the directors are W. P. Seipp, W. C. Feuchter, Thomas Wheeler, Frank E. Lane and Marcus Alexander, all of Buffalo, but several of them who were approached by a Motor world man declined to give any information, referring the inquirer to the company's attorney, who also refused information. He stated that it would be at least ten days before the company would be able to give the names of the five companies which are concerned in the merger. Of the capital stock of the new company, $700,000 is common and $300,000 preferred.

Toole Strikes at Gearless Steering.

Alleging that he had been deceived, and that the article which it proposed to manufacture is worthless, Samuel Toole has applied to the Superior Court in Indianapolis for a receiver for the Gearless Steering Device Co., of that city. He also asks for a judgment of $15,000 against W. E. Kurtz, J. A. Kurtz and H. H. Fulton, the directors and sponsors of the company, which sought to make a so-called gearless steering apparatus for motor cars. In his complaint, Toole states that he became interested in the company through a newspaper advertisement, and that on investigation was told that $14,171 had been expended on the plant and that it had a working capital of $12,500. On the strength of this and other representations he was induced to invest $11,000 in the company which he now denounces. He alleges that it has considerable machinery and other property in storage, and asks that a receiver be appointed to take charge of its assets and to render an accounting.

DID DYER "HOLD OUT" ON A. L. A. M.?

Likely That Such a Charge Will Mark Litigation Over His Patents—Most Vital Patents Were Pending.

Although the litigation instituted by the Enterprize Automobile Co., of New York, which practically is another name for Leonard H. Dyer, and which involves the Dyer direct drive and sliding gear patents, Nos. 885,986 and 921,863, has not even reached the stage of taking testimony, those who desire to make mountains out of molehills are finding it a fertile field for their purpose.

The patents are far reaching in their scope, but the situation has not changed since the Motor World, in December last, published the first news regarding them.

The main suits, as was then stated, are directed against the Locomobile Co. of America, Winton Motor Carriage Co. and Maxwell-Briscoe, Inc., but as the Dyer interests have served summonses also on about 400 individual owners, wherever desire exists to inflate and exaggerate, the returns from these comparatively petty proceedings render it possible to give to them an importance they really do not possess.

As the three defendant manufacturers are members of the Automobile Board of Trade, which fell heir to A. L. A. M. affairs, the suits are being defended by that organization, and although the complaints were instituted about a year ago the answers have not yet been filed. There are indications, however, that when they are filed, apart from other defenses which may be set up, the Dyer interests will be accused of having committed what practically amounts to sharp practice in their negotiations with the Association of Licensed Automobile Manufacturers.

As the Motor World stated in its story of December last, the A. L. A. M. had acquired from Dyer a license to convey to such of its members as desired it the right to operate under five Dyer patents, all of them having to with change speed levers and certain forms of gearing. The two patents which the Dyer interests have brought to bear against the Locomobile and Winton companies and Maxwell-Briscoe were not included in the contract. As a matter of fact, they were then pending in the Patent Office and there are those who allege that the A. L. A. M., when it executed its contract, had no knowledge of their existence and entered into the agreement with Dyer believing that the five patents included in the agreement covered the entire range of the Dyer inventions. The awakening of the A. L. A. M., it is stated, did not occur until the present litigation first was threatened.

Regardless of other defenses which may be interposed, it is fairly certain that this phase of the matter holds possibilities for criminations and recriminations, and that the testimony is likely to be possessed of sharp edges. Meanwhile, the litigation remains in status quo and the "invitations" which are being extended by the Dyer interests to individual owners to step up and settle at $25 per "settlement" have little, if any, bearing on the merits of the case, and serve chiefly to provide pegs on which to hang exaggerated publicity.

In addition to the suits pending against the Locomobile and Winton companies and Maxwell-Briscoe, there also is pending an action, instituted by Dyer, against the Palmer & Singer Mfg. Co., involving his patent, No. 657,650, covering a guide plate for change speed levers, which patent is one of the five included in the A. L. A. M. contract. Although members of the A. L. A. M., Palmer & Singer did not acquire the shop rights which were open to them and this suit is, of course, separate and apart from those involving patents Nos. 885,986 and 921,863.

Date Set for Sale of Jonz Plant.

Unless a satisfactory proposal is received meanwhile, the plant of the American Automobile Co., in New Albany, Ind., will be disposed of at public sale on April 14, the receiver having been authorized by the courts to take such action. Creditors and stockholders who have claims against the company have been given until May 14th to file their claims. The American Automobile Corporation, which is being formed by men identified with the old company, probably will bid in the plant, which, during its brief career, turned out more "clink of gold" certificates than Jonz motor cars, which it expected to produce.

Elmore Men to Make Krebs Trucks.

The Krebs Commercial Car Co., of Clyde, Ohio, which recently was organized by men previously associated with the Elmore company, of that city, has completed its organization by electing the following officers: B. A. Becker, president; George Slessman, vice-president; Homer Metzger, secretary; Robert B. Jones, treasurer; J. I. C. Krebs, general manager. The company will produce a truck of 1,500 pounds capacity, which will employ a two-cylinder, two-cycle block motor, the dimensions of which are 4½x5 inches.

Morgan & Wright Buy More Property.

The old factory of the Olds Motor Works, in Detroit, which until recently was used by the Welch Motor Car Co., which also is a General Motors possession, has been sold to Morgan & Wright for a consideration of approximately $100,000. The property, which directly adjoins the Morgan & Wright plant, is 200x1,100 feet, and its acquisition is accepted as presaging an enlargement of the Morgan & Wright factory.

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AMPLEX SECURES RIGHT TO AXLE

After Long Fight With Packard, Court Sustains Its Contentions—The Type of Construction at Stake.

After a protracted struggle over patent No. 904,744, which was carried through the various ramifications of the patent office until it reached the Court of Appeals of the District of Columbia, the Simplex Motor Car Co., of Mishawaka, Ind., manufacturer of the Amplex car, has been judicially confirmed in its right to the exclusive use of the rear axle casing construction covered by the patent, which has been employed both by the Simplex company and the Packard Motor Car Co., of Detroit, for several years. The Simplex interests won every stage of the interference proceedings, but the Packard people refused to surrender and carried the case higher each time.

The sectional construction of the built-up rear axle casing was the issue at stake. The axle is made up of four sections, two of which are joined to form the central housing enclosing the bevel driving gears and the differential, the other two being the end sections, upon the outer extremities of which the bearings for the wheels are carried. The inner ends of the outer sections are made with tubular sleeves which telescope into corresponding receptacles in the central housing, the telescoping parts serving not only to join the various sections together, but also to provide supports for the bearings on which the inner ends of the driving shafts are carried and to prevent the egress of the oil which otherwise could work along the hollow arms and find its way out through the wheel bearings. The patent in question was granted November 24, 1908, and is owned by the Simplex company.

Briscoe Denies the Thomas Rumor.

Because the same financial interests which took over the old E. R. Thomas Motor Co., of Buffalo, about a year ago, are also heavily interested in the United States Motor Co., the report was spread broadcast this week that the latter had formally embraced the Buffalo company and would make Thomas cars the leader of the United States line. President Briscoe, of the United States Motor Co., however, declares that the rumor is unfounded. He states that the Thomas company is no closer to the United States company than it was a year ago.

Pittsburgh Capital Invested in Engines.

Pittsburgh capital having been interested in the Model Gas Engine Works, of Peru, Ind., a branch factory is to be established in the Pennsylvania city, negotiations to that end already having been completed. F. F. Nicola, W. C. Coffin, J. T. Keenan, J. G. Vilsack and O. J. Vilsack are the Pittsburghers concerned in the project, two of them at least being men of considerable wealth. They are said to have invested $300,000 in the Model company, which hereafter will build only the higher grade of engines. It is stated that among other large contracts recently secured is one from the Baldwin Locomotive Works, which will employ Model engines on all of its gasolene propelled railway apparatus. E. A. Myers, general manager of the Model Gas Engine Works, is at present in Pittsburgh selecting a site for a factory in that city and completing other necessary arrangements. He will be in full charge of both plants.

Carhartt Sued on Contract for Motors.

Suit for $20,000 was instituted on Saturday last in the Circuit Court of Wayne County, in Detroit, by the Continental Motor Mfg. Co., of Muskegon, Mich., against the Carhartt Automobile Corporation, of Detroit. The complaint alleges damages for breach of contract, and grows out of a contract made March 15, 1910, for 200 motors at $244.50 each. Of this number but 42 were accepted by the Carhartt corporation, which, according to the complaint, requested the Continental company to delay the manufacture and delivery of the others, and March 17th last year, canceled the contract. The Continental Motor Mfg. Co. agreed to the cancelation, provided the defendant company would pay for the cost of material and labor which had been expended on its accounts. As, despite repeated requests, this has not been done, the Continental company has been forced to go to law to recoup itself.

Willys Buys Control of Gramm Trucks.

For some time it has been known that John N. Willys, president and owner of the Willys-Overland Co., of Toledo, was contemplating the development of a truck of his own and the establishment of a truck factory, but finally he has decided to do neither. Instead, he has purchased a controlling interest in the Gramm Motor Truck Co., of Lima, Ohio, which is not merely a growing concern, with a complete line of commercial vehicles, but which has been established for many years and already has acquired a reputation. The Gramm plant comprises 6¼ acres under roof and employs 1,200 men. The consideration involved has not been made public. Although Willys has acquired control, B. A. Gramm, president of the Gramm company, will remain in direct charge of the Lima plant.

Again Enlarging Timken-Detroit Plant.

The Timken-Detroit Axle Co. has broken ground for a four-story addition to its plant on Clarke avenue, Detroit, which, when completed, will increase the factory capacity 25 per cent. The new structure will be of brick and steel, 65x150 feet, and will be ready for occupancy June 1st.

KRUPP MOTORS WORKED IN SECRET

But German Steel Company Draws Them Into Limelight—Infringement Suit Brings Disclosures.

Light soon may be shed upon the assets, activities and intentions of the Krupp Motors Co., of Pittsburgh, Pa., as the result of a suit for infringement of the "Krupp" trademark, which was filed against it last week in the United States District Court at Wilmington, Del., by Thomas Prosser, 15 Gold street, New York City, the accredited Krupp agent for the United States. For some time past the Krupp Motors Co. has been one of the mysteries of the trade. All that was known of it was the report that it was looking for a factory site, and that it claimed to have purchased ten acres at Beaver Falls, Pa. It had offices in the Jenkins Arcade building in the "Smoky City," but no intimation was vouchsafed to inquirers as to when or where its "Krupp" automobiles, "Krupp" cars and "Krupp" steel cars were to be manufactured.

Despite this slight drawback the company, according to the statement attributed to its president, boasted of a wonderful business. All the $250,000 stock issued is said to have been sold, and one of the large Chicago banking houses is alleged to have offered to take over an entire bond issue of $5,000,000, if the company would create one. The Krupp Motors Co., however, spur-r-ned the offer; it would create no bonded indebtedness; it had bought 10 acres of land for a factory site and would pay $40,000 for it, when "the title was passed." A plant to cost $600,000 would be erected on the site, President Morgan declared, but how the $250,000 stock issue was to pay for the $600,000 plant and the necessary manufacturing operations he failed to explain, unless the explanation lies in the assertion that the company, while endeavoring to hide its light under a bushel, contracted for 250 cars to be shipped to Australia, 350 to Chicago and 450 to parties in Pittsburgh. The company is stated to have had considerable trouble in keeping its projects and plans from the papers, and that it was far from looking for advertising, etc. All of which information, and a good deal more, is contained in an affidavit filed in connection with the suit, which is made out by David L. Raine, of New York City, who, on March 2, interviewed D. Morgan in his office in the Jenkins Arcade building.

During the course of the interview the caller was informed, he claims, that the name "Krupp" was utilized for the reason that the officers of the Pittsburgh concern knew what Krupp steel was and what it stood for. The name, accordingly, was of value. Raine further declares that a large lithograph of the Krupp works in Essen,

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Germany, was hanging on the wall in Morgan's office when he called.

It is set forth in the bill that the defendant, "with intent to deceive and mislead the public and purchasers, and cause them to believe" that the Krupps of Germany made its products, has advertised "The Krupp Automobile, "The Krupp Car" and "Krupp Steel Car." It is alleged that this is in violation of the complainant's exclusive right to the word "Krupp" as its trademark.

Besides Morgan, the only names mentioned in connection with the company are G. H. Anderson and James McMorran, stockholders.

Elmer and Lohr Move "Six" to Cleveland.

H. H. Elmer, one time general manager of the Haynes Automobile Co., of Kokomo, Ind., who, with several other members of the Haynes staff, last year formed the Elmer Motor Corporation and apparently acquired the plant of the embarrassed Elkhart Motor Car Co., in Elkhart, Ind., has changed his base of operations to Cleveland, Ohio, where he has formed the Grant Car Co. Elmer is president and general manager.

The company purposes manufacturing what will be styled the Grant Six, which is the same six-cylinder model, designed by Charles E. Lohr, which it was intended to produce in Elkhart. Lohr, H. H. Murden, J. S. Worthington and E. W. Lawrence, all of whom were associated with Elmer in the Elkhart venture, comprise the engineering staff of the Cleveland concern.

The Elkhart property appears never to have come into the possession of the Elmer Auto Corporation. It was enmeshed in legal entanglements which, coupled with lack of capital, served to cause the Elkhart enterprise to be quietly abandoned.

Donaldson Joins Hands With Tracy.

Joseph Tracy, of New York, has taken unto himself a partner, who is no less than Henry F. Donaldson, president of the Society of Automobile Engineers. They will continue and enlarge the consulting engineering work performed by Tracy for several years, their field extending into research, development, design, construction, laboratory and road tests. For the present the headquarters in New York will be in the office already established by Tracy at 112 West 39th street. The Tracy testing laboratory in Rutherford, N. J., will be maintained as heretofore.

MacDonald Fails to Secure Injunction.

Judge Platt, sitting in the United States District Court in Hartford, has denied the motion for a temporary injunction made by John N. McDonald, of Weathersfield, Conn., seeking to restrain the Post & Lester Co., of Hartford, from alleged infringement of the MacDonald patent covering a tire chain repair tool. In dismissing the motion, Judge Platt directed that the case be proceeded with in the usual way.

OLD TRADESMEN IN NEW PLACES

Some Resign and Many Climb to Higher Positions—Transfers Reported from All Parts of the Country.

George I. Pound has been appointed general eastern sales manager for the Rowe Motor Truck Co., of Coatesville, Pa. Temporarily he will make his headquarters at 327 East 84th street, New York.

George Weber has been appointed factory manager for the Metzger Motor Car Co., of Detroit. He has had wide experience in the same capacity with the Locomobile, Buick and Waltham companies.

J. Arthur Hoffman, who for more than three years has had charge of the Studebaker Corporation's engineering board, has relinquished that position and retired from the automobile industry. He will engage in the real estate business for himself in Detroit.

John F. Toole, manager of the F. B. Stearns Co.'s branch in Atlanta, Ga., has been promoted to the management of the Stearns Pacific Coast branch in San Francisco. He succeeds A. S. Holden, who resigned in order to return to his home in Cleveland.

W. T. Wiggins, formerly an auditor for the Studebaker Corporation, has been appointed manager of the Studebaker branch in Portland, Ore. He succeeds Lloyd F. Weaver, who has been transferred to the management of the Studebaker branch in San Francisco.

Jasper Ewing Brady, who formerly represented the Ohio Motor Car Co. in the territory adjacent to Kansas City, has been transferred to Chicago, where he has assumed the title of district manager. The interests of the Ohio car in Kansas City and thereabouts have been taken over by the recently organized Ohio Motor Sales Co., of Missouri.

A. F. B. Klein, formerly manager of the Baker Electric branch in Chicago, has resigned that office to become manager for the Ohio Motor Car Co. in Chicago. He will have charge of the Ohio branch and garage, which will be opened May 1st at Michigan avenue and 21st street, and which will replace the temporary headquarters at 1523 Wabash avenue.

C. G. Wilson, who only recently was appointed manager of the Midland Motor Car Co.'s Chicago branch, has been called to the factory at Moline, where he has assumed the sales management of the company. Arthur H. Sackett, who has been identified with the Stevens-Duryea interests in Chicago, has succeeded Wilson as manager of the Midland branch in that city.

To fill the vacancies caused by the retirement of C. C. Hildebrand as assistant general manager and sales manager of the Chalmers Motor Co., of Detroit, H. W. Ford, secretary and advertising manager of the company, has been promoted to the first named office, and Percy Owen has been brought from New York to fill the post of sales manager. Like Hugh Chalmers himself, Ford is a graduate from the National Cash Register Co., while Owen has been identified with the automobile industry since its teething period. He is a genuine member of the old guard of the trade, and latterly has been sales manager for Carl H. Page & Co., the Chalmers agents in New York.

American Tire Treads for Europe.

A. A. Hedinger, until recently Boston manager for the J. M. Shock Absorber Co., has been appointed European representative of the Leather Tire Goods Co., of Niagara Falls, N. Y., and already has sailed for London with a stock of that company's Woodworth tire treads. He will carry a supply in London, and will also have an office on the Continent, where agencies will be established and where it is not unlikely a factory will ultimately be located. Most of Hedinger's work will be performed in Continental Europe, as the Woodworth tread agency in Great Britain already is in the hands of Morris, Russell & Co., of London. Until last year Hedinger, who is a native of Switzerland, handled American typewriters in Europe, which implies that he knows the territory which he will cover and the conditions he will encounter.

Company Built Around the Goby Engine.

The Goby Engine Co., which has been in process of organization in Cleveland, Ohio, for some time and which purposes building a sliding valve engine invented by C. S. Goby, which is reported to be something of a marvel, has completed its organization by electing Christian Girl, president; John D. Hull, of the Perfection Spring Co., vice-president; Ernest W. Farr, treasurer, and P. A. Connolly, secretary. The company, which is capitalized at $100,000, will build the Goby engine for the trade, and may license automobile manufacturers to make their own motors.

To Build Bodies for Canadian Trade.

Backed by several Detroit men, the National Body Co., Ltd., has been organized in Windsor, Ont., which is directly opposite Detroit, and will manufacture automobile bodies for the Canadian trade. A three-acre site has been secured, on which will be erected a two-story brick factory, 300x55 feet. The company will incorporate with a capital of $100,000.

To Double Output of Rawhide Gears.

The New Process Rawhide Co., manufacturer of rawhide gears, is about to make contracts for the enlargement of its plant in Syracuse, N. Y., which will just about double its capacity. The enlargement will comprise a four-story building, 125x66 feet, and a two-story addition to the present two-story factory.

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BIG TAXICAB DEAL CONSUMMATED

New York's Largest Companies, Both Anxious to Sell, Finally Strike a Bargain—One Retains Bus Line.

The stockholders of the New York Transportation Co., the biggest taxicab operating concern in New York City, at a special meeting held in Jersey City on Tuesday, 26th inst., formally ratified the sale of the company's taxicab business and good will to the Connecticut Cab Co., and by the terms of the sale the latter company will take over the business and move into the quarters of the New York Transportation Co., at 49th street and Eighth avenue, on June 1st, next. The price paid for the 600-odd cabs, the equipment and the plant was not made public, but it is understood that it was a reasonable one. The New York Transportation Co. hereafter will devote its principal energies to the Fifth Avenue Coach Co., which it owns, and the scope of which, it is said, will be considerably enlarged in the near future.

The sale of the New York Transportation Co.'s taxicab business scarcely comes as a surprise. It has been known for some time that the company was desirous of disposing of it, though it was not until recently that matters were brought to a head. Similarly, it was rumored that the Connecticut Cab Co. was anxious to dispose of its holdings because of the small return on the investment. By taking over the cabs and business of the New York Transportation Co., however, it is hoped to reduce the ratio of overhead expense to profit and that the enlarged business will show a greater average return on the investment than did the smaller one. Whether the arrangement will have any effect on the rates of fare is a matter for the future to bring forth though it is said that "ultimately the fares may be reduced." In the meantime the Connecticut company's rates, which are 20 per cent. higher than the New York Transportation Co.'s, will be extended to the newly acquired equipment.

"A" Makes Use of Well-Known Names.

For a brief period it appeared that the peculiarly titled "A" Automobile Mfg. Co., of Sacramento, Cal., which for a year or more possessed an option on a factory site in that city, a picture of a large and uncommonly handsome automobile factory and plans for a motor car, had attained real importance. It was given out in California last week that R. A. Palmer, formerly general manager of the Cartercar Co., of Pontiac, Mich., and C. A. Trask, formerly superintendent of the same company, together with W. J. Mead, of the General Motors Co., had become interested in the "A" project and the information served to make it loom larger on the trade horizon. Unfortunately, however, Trask is now in Europe, and Palmer absolutely denies that he is or ever was interested in any way, shape or form in the California promotion. A representative of the latter concern was recently in Detroit, and at that time approached Palmer with a view of having him produce the chassis for the proposed California car, but Palmer prompty put aside the temptation. The report of his connection with it undoubtedly grew out of that circumstance.

Carter Corporation Formally Bankrupt.

After untying several legal knots, the court has formally adjudged the Carter Motor Car Corporation, of Washington, D. C., a bankrupt, the adjudication providing that the equity proceeding in Maryland, where the factory is located, shall not be interfered with. A. Gary Carter, president of the bankrupt concern, was also relieved as one of the receivers, Lucas P. Lowell being appointed to fill the vacancy. He will act as co-receiver with Wilton J. Lambert, and they will dispose of the assets of the company by order of the court. Meanwhile Gary A. Carter, as stated in last week's Motor World, has formed the Washington Motor Car Corporation, with himself as president, which company purposes operating the factory at Hyattsville, Md., and continuing the business.

Four Buildings for Ford on Coast.

After having spent considerable time on the Pacific Coast, James Couzens, secretary and treasurer of the Ford Motor Co., has returned to Detroit, after having perfected arrangements for the erection of four buildings which the Ford company will maintain in that part of the country. Since his return he has authoritatively stated that the four buildings will be located, respectively, in Los Angeles, San Francisco, Portland and Seattle, which statement settles some doubts which existed on that score, particularly as relating to the erection of at least two of the buildings. The structures will be of reinforced concrete, and under one roof will be housed salesrooms, service stations, storage quarters and an assembling plant, the cost of the four establishments representing an investment of approximately $1,000,000.

More Capital for Invincible Starter.

The Invincible Starter Co., of Detroit, which makes the acetylene starter of that name, has increased its capital stock to $25,000 and eletced new officers, as follows: Edward J. Corbett, president; D. W. Reinohl, vice-president; George S. Anderson, treasurer, and H. J. Weeks, secretary and general manager. In addition to Messrs. Corbett and Reinohl, the directors are Walter E. Oxtoby and George F. Monaghan. The company has increased its production until now it is turning out between 75 and 100 starters daily. Incidentally, the Invincible starter has been adopted by the United States Motor Co as standard equipment.

U. S. MOTOR INCREASES EARNINGS

Six Months' Sales $1,000,000 Better Than Corresponding Period of Last Year—Briscoe on Selling Seasons.

According to a statement issued late last week by Benjamin Briscoe, president of the United States Motor Co., the sales of that big corporation's six automobile manfacturing plants—Maxwell, Columbia, Dayton, Brush and Alden-Sampson—for the six months, August, 1911, to January, 1912, inclusive, were $9,045,631.46, as compared with $8,042,920 for the corresponding period of the previous year.

These figures do not include the business of the Briscoe Mfg. Co., the Providence Engineering Co. or the Gray Motor Co.

The sales of the three latter companies for the six-month periods were $1,286,456.26 and $1,083,179.14, respectively. The profits from the operations of the United States Motor Co. and its manufacturing branches for the six months ending January 31, 1912, were $715,059.16.

"The financial condition of the company is showing constant improvement," said President Briscoe, "and while inventories are still necessarily large, the management of the company believes that their plans, involving a decided reduction of inventories and receivables, will be effected before the end of the fiscal year to an extent that will permit the company to go into the coming fiscal year with practically no floating debt.

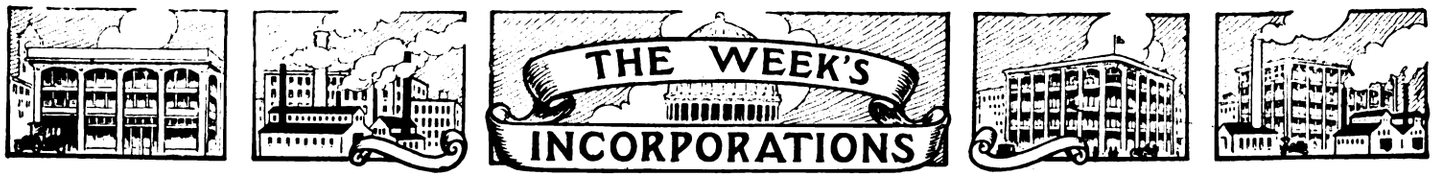
"The automobile business is subject greatly to weather conditions, and is seasonable in the respect that about one-third of the business is done in the first six months of the fiscal year, and two-thirds in the last six months. The experience of the companies comprising the United States Motor Company has shown that the profits on automobile manufacturing for the year's cycle of operation are developed about 33⅓ per cent. in the first six months and 66⅔ per cent. in the last six months.

"The prospects for the heavy selling months—April, May and June—are very bright. There are orders on hand now up to the capacities of the factories for the next 90 days, and if the present rate of sales through the company's selling branches and dealers is maintained the sales will exceed the company's capacity to manufacture. During the month of March the sales have been running at about $100,000 a day."

Maxwell Again Takes Up His Duties.

J. D. Maxwell, president of the Maxwell-Briscoe Motor Co., and vice-president of the United States Motor Co., who some six months ago relinquished his work—but not his offices—to take a long vacation, has resumed his duties. The long rest contributed greatly to his health.

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Hartford, Conn.—Stoddard-Dayton Motor Co., under Connecticut laws, with $5,000 capital.

Lansing, Mich.—Cyclo Carburetter Co., under Michigan laws, with $4,000 capital; to manufacture carburetters.

Galesburg, Ill.—Taxi Livery Co., under Illinois laws, with $5,000 capital; to deal in automobile livery. Corporators — Fred Peterson, R. Moore, Charles Miller.

Syracuse, N. Y.—Bissell Garage, under New York laws, with $10,000 capital; to operate a garage. Corporators—William H. Bissell, Philip Manheim, Budd Walts.

Chicago, Ill.—Empire Auto Repair Co., under Illinois laws, with $4,000 capital; to repair automobiles. Corporators—Ezra T. Fidler, James Ahern, Burton C. Lindley.

Butte, Neb.—Butte Auto Co., under Nebraska laws, with $15,000 capital; to deal in automobiles. Corporators—Frank E. Couch, J. R. Beatley, R. V. Wilson, F. A. Putnam.

Fort Worth, Tex.—Motor Car Specialty Co., under Texas laws, with $5,000 capital; to deal in automobile supplies. Corporators—E. C. Gose, F. H. High, R. R. Gilliland.

Newark, N. J.—Weldon Roberts Rubber Co., under New Jersey laws, with $100,000 capital; to manufacture rubber goods. Corporators—W. Roberts, P. F. Campbell, A. H. Sonn, all of Newark.

Cleveland, Ohio—Bingham Motor Car Co., under Ohio laws, with $10,000 capital; to deal in motor cars. Corporators—Herbert Bingham, C. N. Fiscus, C. F. Schrod, E. E. Thomas, William H. Gillie.

San Francisco, Cal.—Goodyear Tire and Rubber Co. of California, under California laws, with $100,000 capital; to deal in automobile tires, etc. Corporators—N. B. Taylor, E. Linkenfelder, J. F. Wise.

Toledo, Ohio—Erie Supply Co., under Ohio laws, with $10,000 capital; to deal in automobile supplies. Corporators—William J. Fritsche, Fred H. Kruse, Jennie Sansen, F. A. Brown and Mark Winchester.

New Brunswick, N. J.—New Brunswick Garage Co., under New Jersey laws, with $25,000 capital; to operate automobile garages. Corporators—J. Weigel, Jr., O. F. Bentell, W. Silzer, all of New Brunswick.

Akron, Ohio—Akron Motor Washer Co., under Ohio laws, with $10,000 capital; to manufacture automobile washing machines. Corporators—John Bauer, C. W. Sieber, M. F. Wolf, Joseph B. Sieber and M. Bauer.

Youngstown, Ohio — Motor Necessities Co., under Ohio laws, with $10,000 capital; to deal in automobile sundries. Corporators—L. H. Black, Chas. T. Gaither, Oscar G. Deibel, C. A. Manchester, L. A. Manchester.

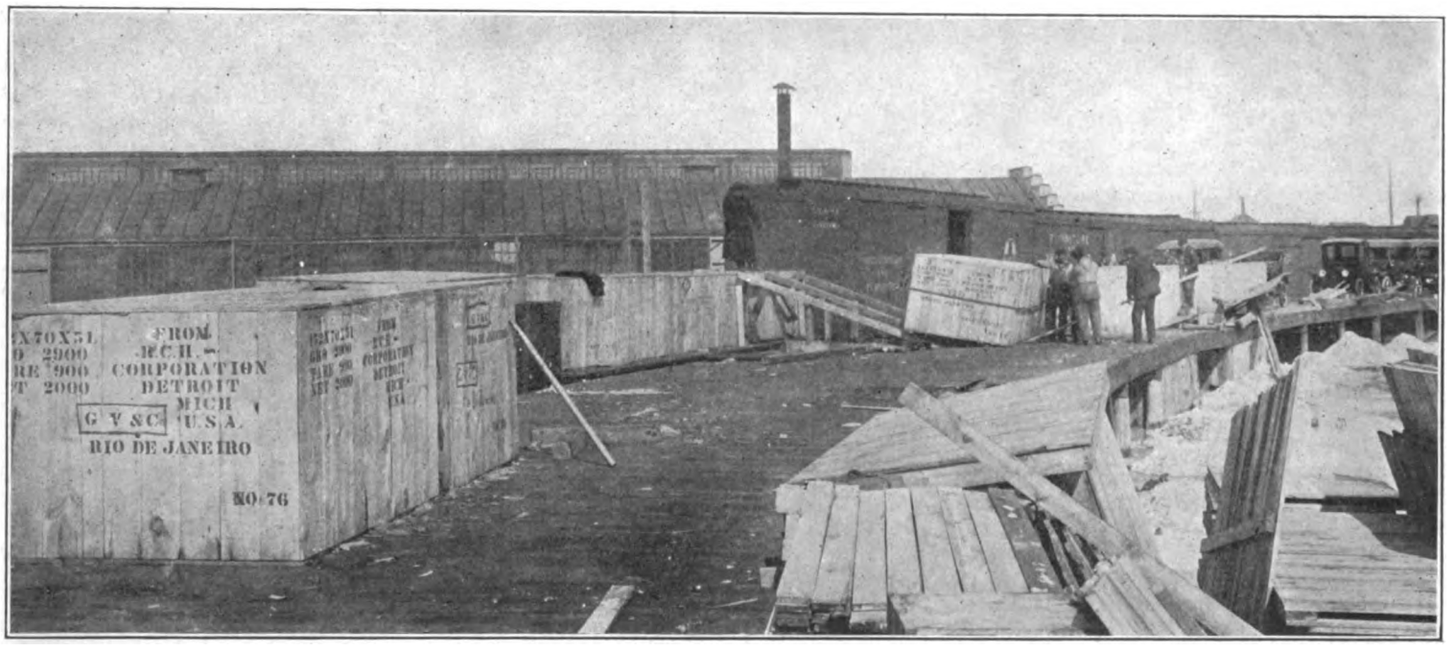
Canadaigua, N. Y.—William J. Hawley Automobile Co., under New York laws, with $30,000 capital; to deal in motor vehicles and supplies. Corporators—Edson T. Case, William J. Hawley, Lincoln H. Hawley, all of Canandaigua.

Onondaga Hill, N. Y.—Boyle Bros. & Pate Co., under New York laws, with $5,000 capital; to conduct a general automobile selling and repairing business. Corporators—William D. Boyle, Jesse R. Boyle and Albert N. Pate, all of Syracuse.

New York, N. Y.—Market and Harlem Auto Trucking Co., under New York laws, with $10,000 capital; to operate an automobile delivery. Corporators — Burgess Osterhout, 633 West 115th street; James L. Robinson, 309 Lafayette avenue, Brooklyn; William Eastman, Roslyn, N. Y.

New York, N. Y.—Pierce, Wells & Keedwell Co., under New York laws, with $10,000 capital; to deal in motors, automobiles, etc. Corporators—Peter Krudler, Jr., the Bronx; Albert C. Keedwell and Albert D. Keedewll, both of 171 West 80th street.

Brooklyn, N. Y.—Alpha Rim Co., under New York laws, with $100,000 capital; to manufacture automobile rims, tires and supplies. Corporators—Clarence M. O'Donnell, 301 St. Nicholas avenue, New York City; George H. Tice, 480 16th street, and Max P. Bau, 197 Norman avenue.



SHIPPING PLATFORM AT R. C. H. FACTORY IN DETROIT SHOWING CARS BOXED FOR EXPORT

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Robert Craig and Harry Bellamy have established a garage in Manchester, Conn.

G. P. Rothenberger & Son have opened a garage at 626 Superior street, Antigo, Wis.

Chappell Foote has opened a salesroom in Topeka, Kan. He has the agency for Cino cars.

Aaron Cohen and F. M. Zimmerman are preparing to open a salesroom in New Britain, Conn.

Carter & Hanson have purchased the garage formerly operated by Steve Davis in Dalton, Neb.

M. S. Van Eaton and A. J. Smith have formed a partnership and opened a garage at Pisgah, Iowa.

Milo Ball has opened a garage in Highland, Kan., where he will show Mitchell and Overland cars.

Henry Vogel and Frank McCord have formed a partnership and opened a garage in Carrington, N. D.

Carl Hagenson has sold his garage in Brown Valley, Minn., to H. J. Strasburg and Granville F. Rollins.

Dudley V. Haddock has purchased the interest of Byrd Latham in the Lewis Garage, St. Petersburg, Fla.

The Wilkes & Russell Garage in Massena, N. Y., has changed hands. Howard C. Munsen is the new owner.

A. R. Mayer has leased the garage and salesroom of the F. E. Walsh Garage on Eighth street, Milwaukee, Wis.

William Tweed has purchased the garage in Binford, N. D., owned by Edward Johnson and O. S. Broadshaugh.

Charles H. Duryea and William E. Sprague have formed a partnership and opened a garage in Babylon, L. I.

I. B. Ballard and I. N. Beeson have opened a garage at the corner of Monroe street and Sharp avenue, Spokane, Wash.

General Fred W. Green and Eugene Kerstetter have bought a lot on First street, Ionia, Mich., on which to erect a garage building.

The Tremaine Garage, at Phœnix, Ariz., has opened for business on West Washington street. Hudson and Mitchell cars will be dealt in.

The Central Automobile Supply Co. has established salesrooms at 310 Ninth street, Des Moines, Ia. A. W. Eggersten is president of the company.

I. M. Spoogle and E. S. Sauber have formed a partnership under the style Allen's Garage Co., and opened salesrooms and a garage at Chico, Cal.

W. D. Kenny, of Kansas City, has invaded Wichita, Kan., and opened salesrooms at 238 South Market street. He will handle Detroit Electric cars.

The Merwin Auto Sales and Repair Co. has taken over the Motor Mart Garage in Youngstown, Ohio, and will carry on a general garage and repair business.

C. Cassard Schroth, representative for the Stearns-Knight cars in Washington, D. C., has removed his salesrooms from 908 to 1608 Fourteenth street, N. W.

Twin Bridges, Mont., soon will boast of its first garage. G. F. White and T. W. Stalcup are remodeling the old Seyler building on Madison street for that purpose.

Gus D. Revol, the Cadillac agent at New Orleans, La., has transferred his store from Julia street to Automobile Row—which in this case means to 701 Baronne street.

The business of the Atlantic Garage at Grant City, N. Y., has been acquired by R. Jurgenson and Frank B. Killian. They will do business under the style the J. & K. Motor Car Co.

The Klemme Auto Co., of Davenport, Ia., has been taken over by a new company, the Union Auto Co., of which Louis Otto is president, R. H. Postel secretary, and George Thoen treasurer.

Arthur Soss has purchased the interest of L. Van Doren in the O Street Garage, Lincoln, Neb., and will continue the business alone. He has the agency for Maxwell, Cutting and Marathon cars.

The Hartford Suspension Co. has established a branch in Detroit at 801 Woodward avenue, of which M. L. Mathews is manager. A full stock of Truffault-Hartford shock absorbers will be carried.

The John Deere Plow Co., of Dallas, Tex., dealer in agricultural machinery, with branches all over the country, has added automobiles to its line. It will sell Abbott-Detroit cars throughout the Lone Star State.

Carroll A. Haines & Co., of Philadelphia, agents for Baker electrics, have added gasolene vehicles to their line and taken the agency for Herreshoff cars. Their salesrooms are at 2214 Spring Garden street.

Krueger Brothers, who have the largest tailoring establishment in Neodesha, Kan., have branched out into new fields and added automobiles to their suits and overcoats. They have taken the agency for Overland cars.

LeHardy & Lindsay, who handle the Marmon line at Rochester, N. Y., have found their salesroom too cramped and will move into more spacious quarters next month. Their new address will be 398 East avenue.

The Reed Motor Supply Co. has been organized with E. A. Reed as president, and headquarters at 80 West Seventh street, St. Paul, Minn., Reed formerly was a partner in the Electric Mfg. Co., 355 Minnesota street.

The New York Auto Exchange has opened salesrooms at the junction of Granby, Bute and Charlotte streets, Norfolk, Va. It will handle the R. C. H. and Case cars, as well as the White line of pleasure cars and trucks.

Universal motor trucks will be distributed in Chicago, Ill., by a direct factory branch which has just been opened at 2216 Michigan avenue. Charles Fisher, formerly sales manager of the Mais Motor Truck Co., is in charge.

Under the style of the Velie Auto Sales Co., a company has been organized in Waterville, Me., with headquarters at 24 Charles street, and E. T. Morton as manager. As the name indicates, Velie cars are to be featured.

Under the style the Batavia Tire Co., a tire supply store has been opened in Greenwich, Conn., under the management of Walter Scofield. It will be ready for business on April 1, and will make a specialty of Batavia tires.

Under the style the Marion-Garford Co., a new concern has been established in Boston, Mass., with headquarters at 1016 Commonwealth avenue, and F. F. Wentworth as manager. As the name indicates, Marion and Garford cars will be carried.

The Ford Motor Car Co., of Spokane, Wash., has moved from its old location at 1228 Sprague avenue to more commodious quarters at 1221 Riverside avenue. The old quarters in Sprague avenue will be occupied by the Abbott-Detroit Sales Co.

With the object of handling the Minnesota-made Luverne automobile, the Luverne Automobile Sales Co. has been organized in the Twin Cities. A. G. Bauer is the St. Paul manager, while E. F. Bauer will look after the Minneapolis salesroom.

The Steckel Motor Truck Co. has established salesrooms at 1414 Ridge avenue, Philadelphia, Pa., where Lincoln delivery wagons and B. O. E. trucks will be handled. Eastern Pennsylvania and southern New Jersey are included in the concern's territory.

Under the style of Graham & Seizer a

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new firm has been in formed in Peoria, Ill., to take over the business of M. M. Baker & Co., dealers in automobile and electrical supplies, at 625 Main street. R. F. Graham and L. M. Seizer comprise the new firm.

J. H. Van Brunt and William Bogen have formed the Selden-Maxwell Automobile Co. in St. Joseph, Mo., and opened a salesroom at the corner of Ninth and Francis streets. As the name indicates they will handle Selden and Maxwell pleasure cars, and Sampson trucks.

Heralded as one of the largest and best equipped supply houses in the West, the Arthur Storz Auto Supply Co. has commenced business at 2022 Farnam street, Omaha, Neb. Arthur C. Storz, Donald D. Troup and Hal M. Brady are the men composing the company.

The Connecticut headquarters for Atterbury trucks has been moved from the town of Meriden to 19 Hoadley place, Hartford, in the same State. Edward J. Ives is manager of the company, which will establish sub-agencies in New London, New Haven and Waterbury.

Clarence Naville, of Ambia, Ind., has taken over the interest of J. Bryant in the firm of Bryant & Holloway, who operate a garage at 210 Columbia street, Lafayette, Ind. Simultaneously with the change of ownership the name of the company has been changed to Holloway & Naville.

A voluntary petition in bankruptcy has been filed by the Auto and Motor Boat Co., of 801 Capitol avenue, Houston, Tex. Its liabilities are $22,388.13 and its assets $8,456.79, the latter consisting of $5,372.29 in open accounts and two second-hand automobiles. More than 60 creditors are listed in the schedules.

Dugger & Willis have purchased the entire business and good-will of the Mount Pleasant Auto Machine Co., which conducted a foundry, repair shop and garage in the Tennessee town of that name. They will continue the foundry and repair departments, but will abandon the garage, as that has proved unprofitable.

For a consideration of $50,000, W. P. B. Campbell has sold the Parker Garage, at 45 South 10th street, Minneapolis, Minn., to John McKnight. The sale only involves the real estate and building, the agency of the Lozier and Marmon lines being continued by Campbell in the old quarters under a lease agreement.

Because H. DeWilde has retired from the Wallace-DeWilde Co., of Newark, N. J., distributor of Cole cars in Hudson and Essex counties, New Jersey, the name of the company has been changed to the Wallace Motor Car Co., with Henry A. O'Brien as president; John B. Wallace, treasurer, and J. H. Bawden, assistant sales manager.

Having found its present quarters too small, the Kline Kar Motor Co., of Pittsburgh, Pa., of which J. D. Kerr is manager, has let contracts for the erection of a modern fireproof building on the Boulevard in that city. It will have a frontage of 80 feet, with a white and blue face, and will contain all conveniences. It will cost approximately $30,000.

William M. Botto, who was vice-president of both the Abbott Motor Co. and the Regal Sales Co., agents for Abbott and Regal cars, respectively, in New York City, has sold out his interests in both companies and become affiliated with a new company which will devote its energies to the sale of Imperial and Havers cars. The new company is practically a reorganization of the Detmar Auto Sales Co., in which Fred C. Robie, formerly of the Excelsior Supply Co., of Chicago, and Albert L. Kull, another old-timer, remain. The quarters of the Detmar Auto Sales Co., at 1662 Broadway, will be retained.

Recent Losses by Fire.

Erie, Pa.—Lambert's Garage, 714 Myrtle street, burned, and eight cars damaged. Loss, on building alone, $1,000.

Washington, D. C.—Terminal Taxicab Co.'s repair shops, 1231 Twentieth street, and six cars destroyed. Total loss, $11,500.

Westerly, R. I.—Westerly Garage, corner Main and Union streets, and five cars destroyed. Loss, $10,000, covered by insurance.

Maple Glenn, Pa.—George Lenhart's body building plant and paint shops and seven automobiles destroyed. Loss, $40,000, partially insured.

Pittsburgh, Pa.—Oakland Automobile Co.'s garage, 3417 Forbes street, damaged by fire for the second time in two weeks. Building and sixteen cars ruined. Loss, $41,000.

Chicago, Ill.—Grand Boulevard Automobile Garage Co. and Stoddard-Dayton Garage, at 43d street and Grand boulevard, with 27 automobiles, destroyed. Estimated loss, $100,000.

Atlas Appeals from Weed Injunction.

On Thursday last, 21st inst., the Atlas Chain Co., of Brooklyn, N. Y., filed an appeal which seeks to stay the preliminary injunction obtained by the Weed Chain Tire Grip Co., of New York, for infringement of the Parsons tire grip patent. The inujnction was granted to the Weed people on presentation of evidence which tended to show that the Atlas chain, while fitting closely the tread of the tire, yet crept slowly, and thereby constituted an infringement of the Parsons patent.

Jury Fixes Damages Panhard Must Pay.

After a trial lasting more than four days, the jury sitting in the United States District Court for the Southern District of New York, on Wednesday, 20th inst, rendered a verdict in favor of the Interborough News Delivery Co. in its suit for $6,663 damages against Panhard & Levassor. The amount of the judgment, however, was reduced to $1,768, this sum representing the damages which, in the opinion of the jury, the News company suffered by reason of the condition of the wagons sold to it by the Panhard people. These wagons did not perform well, and it was charged that they were not 1910 models, as specified in the contract, but contained power plants of older vintage.

Gets Hupmobile Agency for Bulgaria.

H. G. Nergararian, a Bulgarian, who once was in the Oriental rug business in Detroit and who returned to his native country, where he sold agricultural machinery, again has changed his sphere and embarked in the automobile business. He recently visited Detroit, where he secured the Hupmobile agency for several Bulgarian and Roumanian provinces. He will make his headquarters at Varna, Bulgaria.

Indianan "Prospecting" in Kansas.

A. Afander, who is described as a mechanical engineer and designer of Peru, Ind., is reported to be in communication with a commercial club of Hutchinson, Kan., with a view to acquiring the old Sellers automobile plant in that city. Afander has informed the Kansans that he and his associates will pay them a visit and locate an automobile factory "in their midst."

Another American Car Gets Into Japan.

Sale & Frazar, Ltd., an important firm of importers located in Tokyo, who handle American locomotives and the products of the United States Steel Corporation, have enlarged their operations by taking on automobiles. They have secured the Packard agency for Japan, Korea and Manchuria, in which countries they believe there is a considerable market for six-cylinder cars among the nobility.

Randall-Faichney to Build in Boston.

The Randall-Faichney Co., of Boston, which manufactures the Jericho horn, B-line grease guns and other specialties, has let contracts for a concrete factory on Atherton street, near Boylston Station, which is in the West Roxbury district of Boston. The structure will be of four stories, 60x250 feet. It will be occupied jointly by Randall-Faichney, MacKae Mfg. Co. and the Babson-Dow Co.

Krit's President to Make Wide Sweep.

Lawrence Moore, president of the Krit Motor Car Co., of Detroit, has departed for an extended trip, which will include the South, Southwest and Pacific Coast; it will occupy a month or more.

Jackson to Get a Crankshaft Plant.

The Hastings Motor Shaft Co., of Hastings, Mich., is making ready to move to Jackson, in the same State. The company manufactures crankshafts, camshafts, etc.

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NEW YORK, MARCH 28, 1912.

THE MOTOR TRUCK THAT IS STILL LACKING.

It is generally admitted that the motor truck is at its best on long haul work, in which its speed, as compared with that of horses, appears to the best advantage, and its freedom from the effects of fatigue is of the greatest value. Conversely, the motor truck works under the most unfavorable conditions for economical operation when it makes short hauls and stands idle a large proportion of the time on account of delays due to loading and unloading and the like. The distances being short, there is little or no opportunity to utilize the superior speed of which the machine is capable, not because of the machine does not move rapidly when under way, but because the running time is so short as compared with the idle time that the gain is of little practical value. Nevertheless, the fixed charges on the truck remain unchanged and the wear and tear due to frequent stops and starts is approximately equal to that entailed by long runs—more in some cases and less in others. Consequently it costs almost as much to operate a motor truck under these conditions as on long haul work, the only difference being in fuel and oil consumption.

Horses, on the other hand, are at their best when the trips are short and the idle time aggregates a considerable proportion of the day, for they have plenty of rest and thus are enabled to do their best work while on the road. Horses stand up very well under such work, the wear and tear, so to speak, being quite low; whereas on long haul work they not only are necessarily slow, but the protracted exertion entailed by a very hard pull renders a horse unfit for further work until thoroughly rested.

Apparently, then, the horse is at its best on short haul work and the motor truck at its worst, and while there undoubtedly are many motor trucks doing good short distance work, there is an enormous field for a machine that is specially adapted to compete with the horse under conditions that are wholly favorable to the animal. It would seem that this phase of the business has not been given the attention it deserves, and that there is a great field that is practically uncultivated.

As the whole thing resolves itself into a matter of dollars and cents, the solution of the problem clearly is in the designing of a truck that can be operated at a minimum cost. And while it is of course very much easier to suggest that such a thing be done than it is to bring about its accomplishment, it may be pointed out that for short haul work no great speed is required and that less speed means less power, with a corresponding reduction in the expense of operation, of upkeep and wear and tear, of tire cost and, in fact, nearly everything except the fixed charges—and even these would undergo some revision, for the first cost of the truck naturally would be less than that of a high powered machine and the depreciation and insurance would be correspondingly lower. There also is the possibility that a short-haul vehicle could be operated by a less expensive man than a long-distance machine.

It is undeniable that there is plenty of work for the motor truck to do in long distance hauling, and manufacturers as yet have little occasion to invade the last stronghold of the horse; but the fact remains that in order to completely emancipate the horse he must be beaten at his own game, and in order to do this it probably will be necessary for motor truck builders to specialize in machines that, while perhaps unsuited to long distance work, will operate as economically in their own particular field as the high-powered long distance cars do in theirs.

CENTERED CONTROL LEVERS AND TIRE IRONS.

Though the location of control levers in the center of the footboard is a laudable tendency toward increasing accessibility by permitting easy entrance to the driver's compartment from either side, not a little oversight of the possibilities of the construction is apparent on the part of some manufacturers. For instance, there is little sense in carefully designing for center control and then deliberately blocking one of the doors with spare tires. Still there is a very considerable number of manufacturers who do so. The remedy is plainly up to the manufacturer in the original location of the tire irons. Literally, there is no excuse for the carrying of spare tires on the running board other than custom; there are several other places which will serve as well for the purpose, though few manufacturers give evidence of the realization by finding other and better locations. Unfortunately it is necessary that spare tires be carried, but as long as they are carried their location is of little moment provided only that they do not defeat some other ends. At least one manufacturer has hit upon the very good scheme of providing a steel tire case below the body in the region of the rear axle, and the idea marks progress. A few others regularly place tire irons at the back of the body which is not an illogical place for them, though it would seem that there is room for ingenuity on the part of body builders in the designing of suitable compartments where tires may be stored, fully protected and completely out of sight.

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NEW JERSEY IS FREED

Long Fight for Reciprocity Lost and Won Within Six Days—State Senate Reverses Itself—Governor's Approval Already Assured.

On Thursday last, 21st inst., New Jersey, by an 8 to 10 vote of its senate, elected to remain outside the Union for another year by defeating the automobile recoprocity bill which several weeks ago had been passed unanimously by the assembly.

Six days later, Wednesday, 27th inst., the spirit of reason dominated the same body and the senate reconsidered its previous action and, by a vote of 11 to 9, reversed itself, thereby enacting the Stickel bill, and, after a fight that has extended over a period of some five years, tore down the Chinese wall which the live but lamented "carpetbagger," Joseph Frelinghuysen, had erected around the State.

Credit for the reconsideration and the great victory achieved is due largely to Senator Colgate, who refused to be discouraged and to accept as final the adverse action of Thursday last. As victory required that but one senator change his vote, Colgate and his associates who favored the Stickel bill labored unremittingly to that end and finally converted and won over to the side of reason and reciprocity Senators Price and Silzer. Senator Barber, who favored the bill, was absent when the adverse vote was taken on Thursday last, but he was present yesterday and lined up with the majority. The other senators who voted to make their State an integral part of the Union were Messrs. Edge, Fielder, Johnson, Low, Pierce, Prince and Slocum.

Although Carpetbagger Frelinghuysen —who votes in New Jersey but spends most of his time in New York—is no longer a member of the senate, the narrow spirit of Frelinghuysenism was still strong enough to induce Senators Davis, Gaunt, Gebhardt, Hand, Leavitt, Lewis, Nichols, Read and Smalley to cast their ballots against the bill demolishing the Chinese wall. Senator Davis was present when the vote was taken last week, but he straddled the issue and declined to cast his ballot. Yesterday, however, he ranged himself with the opponents of reciprocity.

As Governor Wilson already is committed to the bill, that he will sign it is certain. When it is signed, and the measure becomes a law, non-residents will have the privilege of entering New Jersey without cost for 15 days of each year, while New Jersey motorists, for the first time in many years, will be enabled to visit the other States of the Union without let or hindrance, or special tags or special payments, such as the miserable law imposes on them wherever they go.

The bill carries with it a doubling of the license fees, but as most of the New Jersey automobilists have at nearly all time been ready to accede to an increase of the fees, that feature of the bill has not served to greatly hinder its passage. In the fight for the measure, all of the old familiar arguments were threshed and rethreshed, its opponents, as usual, refusing to see or admit that what is fair and good for all other States is fair and good for New Jersey.

Fisticuffs Follow San Jose Racemeet.

Excitement there was in plenty at the race meet held at the San Jose (Cal.) Driving Park on Sunday afternoon, March 17th, under the auspices of Emile Agraz and W. T. Buehren.

The excitement, however, was not all of the sort which naturally crops out during motor speed contests. Not a little of it was stirred up by the presence of a bad water hole in the backstretch of the track, and the water and mud and spray which emanated therefrom as each of the contending cars dashed across the wet spot added somewhat to the spectacle, and a great deal to the dangers of the drivers, so much so that Weldick, driving a Mitchell car, dropped out of two events, and Jeffkins, in a Buick, out of one, both being temporarily blinded by the muddy water. The most excitement, however, was caused after the racing terminated and took the form of an unannounced fistic encounter between two of the drivers, Agraz and Jeffkins. The Maxwell driver accused his Buick colleague of having "bumped" him on one round of the last event of the day, the 25-mile free-for-all. During the encounter which followed Jeffkins and Agraz were floored successively.

The track honors were about equally divided between Earl Cooper, who piloted the Stutz car and won both the three-cornered match race over a distance of five miles in 5:2 and the 25-mile free-for-all, in which he covered the distance in 25:18, and Earl Devore, whose hand guided the Buick stock car which won the five-mile stock car race in 5:21 and the 10-mile race for cars of 30 horse power in 10:40⅗. In only one event was the average speed better than a mile-a-minute gait. This was in the first event—one mile, flying start, against time—which was won by Jeffkins in 55⅕ seconds, at a speed of 65.2 miles per hour. Summary:

One mile, against time, flying start—Won by R. Jeffkins (Buick); second, Earl Cooper (Stutz); third, Harold Hall (Comet). Time, 55⅕.

Five miles, stock cars—Won by Earl Devore (Buick); second, Emile Agraz (Maxwell); third, Robert Buehren (Sunset). Time, 5:21.

Five miles, three-cornered match—Won by Earl Cooper (Stutz); second, Harold Hall (Comet); third, Jeffkins (Buick). Time, 5:02.

Ten miles, 30 horsepower cars—Won by Earl Devore (Buick); second, Emile Agraz (Maxwell); third, Fay Cooper (Comet). Time, 10:40⅗.

Twenty-five miles, free-for-all—Won by Earl Cooper (Stutz); second, Harold Hall (Comet); third, Emile Agraz (Maxwell). Time, 25:18.



April 29-May 4, Burlington, Vt. — Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal. — Santa Monica road race.

May 14-17, Chicago, Ill.—Chicago Motor Club's reliability run for commercial vehicles.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H. — Rockingham Park track races.

June 20, Chicago, Ill.—Chicago Motor Club's annual hall climbing contest on Algonquin Hill.

Clever Scamp Victimizes Chauffeurs.

After "hiring" a number of chauffeurs to run his imaginary car, and filching them out of "security" ranging from $100 to $500 each, George L. Lewis, of Locust Valley, L. I., finally ran into a trap set for his special benefit, and was placed under arrest early this week. The case against him was so strong and conclusive that he was glad to be allowed to plead guilty to petty larceny.

According to the testimony, Lewis had advertised for a chauffeur, saying that he desired the services of an experienced man to run an automobile at $22 a week. Maurice Hogan, of 260 West Sixteenth street, New York City, answered the advertisement, and upon meeting Lewis was taken to a garage uptown, where he was shown an Alco car. Lewis also told Hogan that he would have every night off, and took him to a tailor's, where he was measured for a complete chauffeur's outfit. Lewis then said that Hogan must give $500 security before he would employ him. Hogan did so, and the next day went to visit Lewis at the Continental Hotel, where he was informed that Lewis had left, giving them a worthless check in payment for his board. Hogan then went to the garage, where he was informed that the automobile did not belong to Lewis.

Hogan next carried his tale of woe to the district-attorney, and, several similar complaints reaching the latter's office at the same time, detectives were commissioned to answer ads that resembled the one which attracted Hogan. As a result they caught Lewis in short order.

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INDIANAPOLIS'S TENTED SHOW

Hoosiers Make Brave Display Amid Most Unusual Surroundings—City Park and Sidewalks Supply Setting.

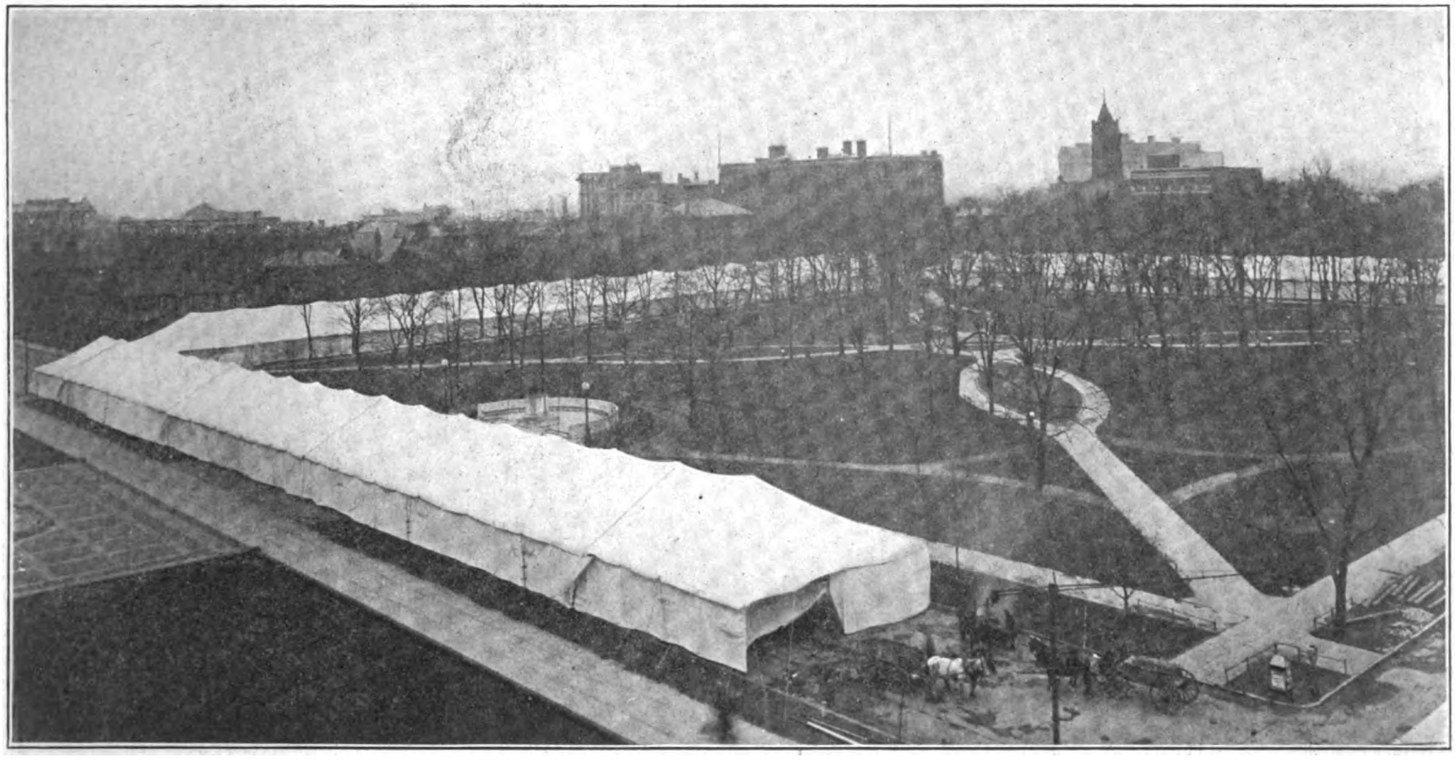
After having tried the "open house" show, the term serving to signify that individual dealers decorated their individual showrooms and kept "open house" for a week for the edification of those who cared to stroll in and inspect the newer models on view, Indianapolis at last has a sure-enough show, housed all under one roof, and it is a show that it is unusual in more than one respect; it was opened on Saturday night, 20th inst., under the auspices of the Indianapolis Automobile Trade Association, and will finish its run on Saturday night, 30th inst.

In the first place, the show bears the distinction of being the first event of its kind to be held literally out on the streets of the city; incidentally, it is the first real show that Indianapolis ever has had, despite the fact that the Indiana city is notable for the number of automobile and accessory manufacturers located just within or just without its limits. As there was no building available which would serve to house all the exhibits without cranping, the promoters hit upon the novel scheme of roofing over a public park with canvas—converting University Park into an immense tenting ground pro tem. Around three sides of the park, the sidewalks and pavements serving as the floor, are ranged the wares of some 72 exhibitors, including 51 varieties of pleasure cars, 13 makes of trucks and almost literally a carload of accessories, to say nothing of nine brands of motorcycles.

Despite the difficulties under which the decorators labored, a more than ordinarily pleasing effect was obtained with the help of strings of incandescent lights of different colors, festoons of laurel and colored bunting stretched from the roof down to the sides, and a plenitude of large American flags draped over the tent poles. Music is furnished by three orchestras, one to each of the three sections of the big exhibition tent. Though on Saturday Indianapolis was visited by a severe rainstorm and on Monday there was almost a foot of snow on the ground, crowds flocked to the show, and, contrary to pessimistic expectations, the canvas roof proved itself impregnable and the inclement weather was kept outside.

Among the 200-odd pleasure cars on view, but a single newcomer put in an appearance. It is the Empire, which is the product of the Empire Automobile Co., of Indianapolis, successor of the Empire Motor Car Co., the previous producer of the car. Though it was the original intention of the company to produce two models, a "20" and a "25," production was centered on the "20," which is shown in both roadster and touring car forms. As the designation of the car indicates, the motor is of 20 horse-power and has four cylinders cast in a single block, and measuring 3½x4½ inches bore and stroke, respectively. The other essential features of the car include multiple disk clutch, three-speed selectively operated change gear mechanism, with a single lever placed in the center of the footboard for control, semi-floating rear axles and 104-inch wheelbase. The chassis is mounted on semi-elliptic springs in the front and three-quarter elliptic springs in the rear; front and rear wheels are shod with 32 x 3 and 32 x 3½ inch tires, respectively, and the list price includes such items of equipment as lamps, tools, tire repair kit, horn and jack.

Of the other exhibitors, those who show pleasure cars are: The American Sales Co., American; Archey-Atkins Co., Pierce-Arrow, Hudson, Detroit electric; Conduitt Auto Co., Peerless, Knox; Capitol Garage Co., Lion; Buick Motor Co., Buick; J. I. Case Co., Case; Cadillac Auto Co., Cadillac; Fisher-Gibson Co., Overland, Stoddard-Dayton, Stearns-Knight, Everitt, Brush; Finch-Freeman Auto Co., Marathon, DeTamble; Ford Motor Car Co., Ford; Frank P. Fox, Pope-Hartford; Hearsey-Willis Co., Hupmobile, Mitchell; Henderson Motor Sales Co., Cole; Haynes Automobile Co., Haynes; Indiana Auto Co., Chalmers, Reo; Ideal Motor Car Co., Stutz; Auburn Motor Co., Auburn; Empire Auto Co., Empire; Baker Electric Sales Co., Baker; Motor Car Mfg. Co., Pathfinder; Merchants' Electric Auto Co., Wescott, Woods; McFarlan Six Sales Co., McFarlan; Nordyke & Marmon Co., Marmon; National Motor Sales Co., National; O. B. Jameson, Staver-Chicago; Oakland Motor Co., Oakland; Premier Motor Sales Co., Premier; Rinne-Pfaff Co., Lambert;



EXTERIOR VIEW OF INDIANAPOLIS'S THREE-SIDED TENTED SHOW SET UP ON PUBLIC STREETS

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Frank Staley Co., R. C. H.; Studebaker Corporation, E-M-F, Flanders; Sterling Motor Car Co., Paige-Detroit, Firestone-Columbus; State Auto Co., Marion, Krit; United Motors Co., Columbia-Knight, Maxwell; Waverley Co., Waverley; Walker Electric Co., Walker; Pilot Motor Car Co., Pilot.

Commercial vehicles were exhibited by: Buick Motor Co., Buick truck; Carr's Auto Place, Little Giant; Finch-Freeman Auto Co., Service; Avery Co., Avery; International Harvester Co., I. H. C. truck; Auburn Motor Co., Auburn; Morton Place Auto Co., Dreadnought-Moline; Merchants' Electric Auto Co., General Motors Co. truck, Kelly; McFarlan Six Sales Co., Whitesides; Mais Motor Truck Co., Mais; Premier Motor Sales Co., Premier; Walker Electric Co., Walker.

The exhibits of accessories and motorcycles are as follows: R. J. Irvin Co., bodies and tops; Hide, Leather and Belting Co., accessories; National Refining Co., lubricants; Auto Lighting and Electric Co., lighting systems; Acme Foundry Co., castings; Frank S. Feeser Co., lighting systems; Fisher-Gibson Co., accessories; Gates Mfg. Co., tops; B. E. Griffy Co., advertising novelties; Guarantee Tire and Rubber Co., accessories; Haywood Tire and Equipment Co., vulcanizing outfits; Hearsey-Willis Co., accessories; Henry Mfg. and Grease Cup Co., grease cups; International Metal Polish Co., metal polish; Indianapolis Auto Top and Rubber Tire Co., tops and wind shields; General Oil Works, lubricants; Electric Light and Starter Co., starters; Indianapolis Brass Co., brass goods; Motor Starter Co., self-starters; Motor Accessories Co., accessories; Charles H. Moore Co., lubricants; Irvin Robbins Co., bodies; Pumpelly Battery Co., batteries; Wyoming Lubricating Spring Co., springs; Sanborn Electric Co., electrical supplies; Johns-Manville Co., electrical supplies; Merkel Motor Co., Merkel; H. L. Dipple, Harley-Davidson; George C. Detch Wheel Co., Reading Standard, Pierce and Pope; G. H. Westing Co., Indian; Gus Habich, Excelsior and Thor; Flanders Motorcycle Co., Flanders.



INTERIOR OF INDIANAPOLIS'S TENTED SHOW—ASPHALT SIDEWALKS SERVING AS SHOW SPACE AND AISLES

Knight Patents "Silent" Connecting Rod.

Having succeeded in obtaining a silent valve mechanism, which later was supplemented by a patented "silent" piston, Charles Y. Knight has turned his attention to the silencing of other parts of his engine, and just has been allowed another British patent, No. 20,508, on a method of constructing connecting-rod big end bearings. The design of the new Knight is extremely simple, embracing the use of rings of some such substance as fiber between the "cheeks" of the crankshaft and the connecting rod bearings. The object aimed at is to prevent any noise being caused by endwise movement of the connecting-rod big end bearings on the crank pins.

Further Decline in French Exports.

Statistics just issued by the French government regarding the exports of motor cars during the first two months of 1912 do not hold much comfort for the French manufacturers. During those two months the decline which set in last year was continued, but $6,010,400 worth of automobiles being sold in other countries, as compared with $6,093, 000 in the same period of the preceding year, a loss of $82,600. Increases were registered in the shipments to Belgium, Germany, Switzerland, Austria, Spain and Algiers, while in all other countries decreases were recorded. Imports of foreign-made cars into France dropped from $425,800 in January-February, 1911, to $325,800 in the same period of 1912. Of all the automobile manufacturing countries the United States alone increased its shipments to France, the figures for the respective periods of 1911 and 1912 being $43,000 and $84,800—an increase of $41,800 or 97 per cent. The United Kingdom suffered a loss of nearly $70,000, while Germany recorded a decrease of $73,000, or more than 60 per cent. Belgium decreased its sales by $10,000.

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PATENTEES AND THEIR RIGHTS OF MONOPOLY

Attorney Who Won the Famous and Much-Abused Mimeograph Case in United States Supreme Court Discusses the Subject and Points Out Why Complete Monopoly Is Proper and Not in Restraint of Trade—Wisdom of Controlling Certain Supplies.

It is so rare that an attorney who wins a case in the Supreme Court of the United States has reason for displeasure that Samuel Owen Edmonds, the member of the New York bar who successfully argued the now famous Dick mimeograph case before that tribunal, may be said to enjoy unique distinction. For despite his great victory, Counselor Edmonds is, if not unhappy, at least not thoroughly pleased. And not without reason; for not often has a decision of the highest court aroused such unmeasured criticism, if not condemnation.

The Dick case, as will be recalled, was decided by a divided vote of the Supreme Court, Chief Justice White writing an uncommonly vigorous dissenting opinion, his expressed fear of grave consequences that might follow the extension of monopolistic trends having been quoted and quite generally applauded throughout the length and breadth of the land, while, by the same token, the ruling of the majority of the court fairly has been lambasted. It is this lambasting—"abuse," Mr. Edmonds terms it—that has contributed to that gentleman's state of mind.

"The volume of ignorance that has been displayed, and the quantity and quality of the misstatements, or misconceptions, that have followed the decision are not short of astonishing," said Mr. Edmonds, who is attorney for the United States Motor Co., among other large concerns, in the course of a talk with a Motor World representative. "Most of the published criticism has grown out of the dissenting opinion of the Chief Justice and the two associates who agreed with him, their views having been printed broadcast while the opinion of the majority of the court appears not to have been generally read, or, if so, it has been but imperfectly digested. Had the prevailing opinion been given half the attention accorded the dissent, much that has been printed would have been left unsaid. The popular notion appears to be that the majority decision upholding the patent is revolutionary. As a matter of fact, it is nothing of the sort. It is in line with the rulings which have been made by the Circuit and Appellate Courts for many years. The law books fairly overflow with similar decisions; every lawyer is familiar with them, and the Dick case attracted general notice because it was the first time that the legal point involved reached the Supreme Court and in doing so brought a dissenting opinion from the Chief Justice himself. This legal point, which was sustained by a majority of the court, is really almost as simple as the alphabet itself. It merely upholds the right of a patentee to do with his invention whatsoever he pleases, and to enjoy for a term of 17 years the exclusive and far-reaching monopoly which is guaranteed by the Constitution of the United States."

"Carried to its logical conclusion," interrupted the Motor World representative, "is it not a fact that the Dick decision gives to a patentee not merely the right to control the manufacture, distribution and price of his invention; but, in the case of a gas engine, for instance, does it not enable him to specify the particular oil, spark plug or magneto which shall be used with the engine, and to require that they shall be purchased from a particular source, and does not such a condition make for industrial chaos?"

"The logic of the decision is exactly as you have stated," replied Mr. Edmonds, "but it is merely the logic of every other decision that has sustained a patent. The holder of a patent may impose any restriction and as many restrictions as he chooses to impose. In the Dick case, for example, if the license required that the mimeograph in question be used only on a table of solid gold, or that it be operated only by a blond woman whose molars were filled with gold, such requirements, however exaggerated and improbable they may appear, would be well within the rights of the patent holder. His monopoly guaranteed by the Constitution must be complete, else it is not monopoly. He can refuse to sell his patented article to anyone, and by the same token there is no law requiring anyone to purchase that article. Unless, for the purpose of acquiring a part of the patentee's statutory monopoly, the intending purchaser sees fit to comply with the patentee's terms, he may forego the use of the patented article or shop elsewhere. In point of fact, these things are perfectly self-regulating, and it is that regulation itself by which the interests of the public are protected. A patentee who imposes onerous or impossible conditions or unreasonable prices takes the most effective measure for throttling the market for his invention. In exactly the proportion that a patentee loads his licensee with onerous burdens, in that proportion does he risk finding no licensee to load with anything. This self-regulating feature of the license plan was well expressed by Judge Townsend in his decision in the case of Cortelyou vs. Johnson, 145 Fed. Rep., 937, decided in 1906."

Turning to the report of the case, Mr. Edmonds continued: "Judge Townsend held that the 'argument ab inconvenienti' (i. e., that the public might be inconvenienced or imposed upon by means of license restrictions), based upon the dangerous doctrine that public policy may nullify existing laws because said laws may be perverted by future unwarranted applications thereof, seems to be fallacious in theory and unwarranted in fact. . . . The self-interest of the patentee, seeking to derive a profit from his patent, will sufficiently protect the public against burdensome or unreasonable restrictions upon its use.

"Take, for example, the case of a motor car licensed under letters patent for use only with gasolene sold in Washington, the car would be purchased by no one who expected to run it farther than the Washington supply would permit. The major part of the business, possibly all of it, would go inevitably to the dealer willing to sell outright or whose license involved less onerous restrictions. If the vendor of the motor car first referred to were daring enough even to attempt a restriction so absurd as that suggested he would speedily be brought to his senses by decreasing sales, or no sales at all, with the result that he would be forced to adopt the plan either of unconditional sales or of sales upon conditions acceptable to users.

"In the case of the Dick mimeograph," went on Mr. Edmonds, "there is little or no profit derived from the manufacture and sale of the mimeograph itself. The cost of production is high, and, as in the case of many inventions, so is the selling cost. Of course, the Dick company might have set a high selling price on the instrument —say $50—but to have done so would have greatly contracted the market. Instead the price was set at about $30, which caused very many more of them to be sold and permitted very many persons to enjoy the benefits of the invention, who at the higher price would be debarred therefrom. In order to obtain a reasonable profit the mimeograph was sold subject to a license requiring that the supplies, such as ink and stencil paper used thereon, be purchased from the Dick company, a condition which is neither unreasonable nor unusual, and which is fair alike to the patentee and the public. In other words, the profit was derived from the sale of supplies and not from the mimeograph.

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Mimeographs, like most other inventions, do not monopolize air, water or other elements of existence, and such restrictions, therefore, are not opposed to public policy. They are not articles of general use, but appeal only to a limited class. The Dick inventions opened up to the public commercial advantages and possibilities which theretofore the public utterly lacked. In those inventions the Dick company was granted a constitutional and statutory monopoly for a limited period. In that monopoly, and until its expiration, the public has no share save to the extent that the patentee, in the exercise of an undoubted right to exclude, lets the public in. No one, however, is forced to buy the mimeograph; whoever buys one does so of his own free will. To obtain a part of the patent monopoly, particularly on the attractive terms on which the machine is offered, he takes the machine subject to the conditions laid down by the patentee. In other words, he is free to take it or leave it, as he pleases. Our own law books are full of decisions sustaining the legality of this business plan. So are those of England. You will find that the British courts, including the Privy Council (corresponding to our Supreme Court), in dealing with cases analogous to the Dick litigation, have uniformly sustained the legality of the plan or practice in question, saying, in one case, that the contention of the patentee 'seems to be common sense and not to depend upon any patent law or any other particular law.'

"Chief Justice White, in his dissenting opinion is fearful that the monopoly enjoyed by patentees may be extended to dangerous limits; he fears that as the majority decision in the Dick case upholds the patentee's right to require that the ink used with his mimeograph be purchased from a certain source, and as the ink is unpatented, the patent law may be rendered so elastic as to embrace within the constitutional monopoly the control of unpatented articles, or of articles on which patents have been refused, or on which they may have expired.

"Personally," continued Mr. Edmonds. "I do not consider the point well taken. Such things, as I have already shown, are self-regulating. In the case of the mimeograph, while this may lawfully be used only with the patentee's supplies, there are no restrictions against the sale or use of ink broadly. Any ink maker is at liberty to sell his ink for any lawful use to which it can be put. In the particular case at bar, possibly the defendant's ink could be used to paint a reproduction of Whistler's 'London Street at Night.' They are free to sell it for that use. They are not, however, free to sell it for the express purpose of violating a patent or in aiding in the commission of any other tort. As with those defendants, so with the public at large. No one save the Dick company ever had the right to sell ink for use on the patented mimeograph. It follows, therefore, that no one is deprived of a right which was previously his by exclusion from the patentee's domain except to such extent as the patentee chooses to let him in. There is one other point that should not be overlooked. There are many inventions that are absolutely safeguarded by license conditions requiring that supplies be purchased from a particular source. In the case of the mimeograph, the ink used has a direct bearing on the quality of the work and the amount of the work which it can be made to produce. In one instance, an ink containing so much benzine was employed that it destroyed the stencil paper before 15 sheets of copy were run off, which is less than one-third or one-fourth of its normal capacity; this means that such ink not only tended to injure the reputation of the mimeograph but actually greatly increased the cost of operation to its purchasers. These facts are so elementary that I am surprised that the effort to distort them attained such strength."

"Is it not a fact," asked the Motor World man, "that in the so-called Bathtub Trust case the manufacturers concerned sought, under a patent covering a dredger for applying enamel to bathtubs to control the manufacture, sale and price of such tubs?"

"The facts, generally speaking, are as you state," responded Mr. Edmonds, "but the bathtub case and the Dick mimeograph case are in no way analogous except to the extent that the bathtub may be compared with the mimeograph ink. Neither the tubs nor the ink are patented, but we are not seeking to control the sale of the ink and impose no restrictions on its use. Also, as I understand it, in the bathtub suit it is not the patent but a contract or agreement or understanding between a number of manufacturers that is the real issue. It is this agreement or understanding which is claimed to be in restraint of trade. Without tearing down the Constitution, no such charge can lie against a patentee. What the court decided in the bathtub case is that, under the Sherman law, trade in an unpatented article may not be restrained merely because a patented machine or process was used in the manufacture of that article. The case did not, in the court's view, come under the patent law at all. In the Dick case, on the other hand, the patents covered the very thing—the mimeograph—the use of which was restricted.

"Nor is the so-called bicycle coaster brake litigation comparable with the Dick suit, as several papers have intimated is the case. As I understand it, the coaster brake situation grew out of a pooling of patents, which implies an agreement of some sort on the part of a number of manufacturers. The citing of this case and the bathtub suit, in both of which the charge is restraint of trade in violation of the Sherman law, is unfortunate; it simply has served to confuse the public mind and to distort the effect of the decision in the Dick case. The latter involved no pooling of patents, no agreements, no contracts, and the decision of the Supreme Court simply reaffirms the right of the patentee to enjoy to the full, for a period of 17 years, the fruits of his ingenuity. It is not in restraint of trade or violation of the Sherman law, because there could be and can be no trade in such mimeographs if the patentee but says the word.

"Congress was wise," vouchsafed Mr. Edmonds, "in granting such monopoly to patentees. I believe that making the possible reward so great has stimulated ingenuity and given the world many priceless benefits which otherwise it would not have enjoyed; I believe it has had as much as anything to do with the fact that, except for a comparatively few scientific discoveries, the United States is the country in which practically all of the most useful inventions have been born. Without such incentives as the law guarantees, I doubt that we would have had such inventions as Edison and Westinghouse, for instance, have given to us. And though, since the decision in the Dick case was rendered, a cry has gone up that our patent laws are 'rotten,' and that they should be revised by Congress, it will be a sorry day if the reward held out for invention is decreased or restricted.

"In the cry that has gone up concerning the 'rottenness' of our patent system," went on Mr. Edmonds, "the laws of other countries have been cited and certain writers have made much of the laws in Germany, for instance, which, until the recent treaty, required that unless a patent be 'worked'—that is, unless the article at stake be actually manufactured in Germany within a period of three years—the invention will become public property. As a matter of fact, however, patent lawyers are well aware that this requirement, even in Germany, does not mean all that it says. When the three-year period is about to expire it is simply necessary for a patentee to advertise his article for sale, and if he is able to prove to the court that the advertisements brought no responses, and that therefore there was no demand for his invention at that time, the 'working law' does not abridge the life of the patent."

"But," queried the interviewer, as he prepared to take his leave, "are not our patent laws 'rotten' to this extent: That when an inventor receives a patent he obtains little more than a license to sue? Is it not a fact that although his patent may bear the seal of the United States it is of practically no value until it is litigated, and that such a state of affairs operates against the inventor of modest means?"

"You have hit the nail squarely on the head," replied Mr. Edmonds. "That is the most regrettable feature of our patent system. The grant of a patent on a really meritorious invention often is a signal to imitators, and the result is litigation, protracted, expensive and harrassing, which often makes the useful life of a patent nearer seven years than 17."

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SETTLEMENT OF TAXICAB STRIKE

Conditions as Meted Out by British Court of Arbitration—Drivers Get the Best of Their Employers.

Following temporary mediation permitting drivers to continue to work, with the understanding that their compensation during the period of cessation of hostilities finally would be adjusted according to the award of the court of arbitration appointed by the London Board of Trade, the dispute between the taxicab drivers and their employers, which precipitated the recent strike at last has been amicably settled.

That the settlement is perfectly satisfactory to the drivers is beyond dispute, for not only are they permitted to take possession of the "extras"—over which the dispute originally arose—but, in addition, certain other matters, including the fixing of the cost of "petrol" as supplied by the companies to their drivers, have been decided in such a manner that hereafter there scarce can be anything but joy in the heart of the London taxicab driver. But if the settlement is satisfactory to the drivers, who actually obtain a great deal more than they asked for or expected, it is equally unsatisfactory to the employers. So unsatisfactory is it, in fact, that dirges have gone up and the immediate demise of all small companies and the not far removed failure of even the larger ones freely is predicted. That is, if the fares—and particularly the initial fare, which, for horsed vehicles, now is one shilling (25 cents), as against 8 pence (16 cents) for motor vehicles—are not raised. That they eventually will be raised appears within reason, for, though they are fixed by law and cannot be changed without proper authority, there is little doubt but that the companies will be able to produce figures of such a nature as to ensure the passage of the desired legislation. The principal awards are as follows:

"1. The extras belong to the drivers.

"2. The drivers' proportion of takings to be 25 per cent.

"3. No rank or station charges to be allowed by the employers.

"4. The employers to supply the drivers with petrol at a fixed price of 16 cents a gallon for the current year, and either to allow mileage at the rate of a gallon for 18 miles, or to give half a gallon per day free. In future years the price of petrol to be fixed by the Conciliation Board, so that the charge to the drivers bears about the same relation as now to the price the employers themselves pay.

"5. The drivers to take cabs out six days per week, or 66 hours per week; no day to exceed 15 hours. Cabs are to be kept for the regular drivers till a reasonable hour (the precise time under varying conditions being specified in the award). Odd men waiting in the garage are to be allowed 12 cents for each full hour's waiting time at which they are requested to come, with a minimum allowance of 25 cents; half rates for waiting time to be allowed to odd men to whom cabs are allotted.

"6. The driver not to be required to pay in at once the sum which he alleges he has lost by a 'bilk' if he can give the name and address of a policeman or other trustworthy person whose evidence he could produce in proof of his allegation when the matter is investigated.

"7. The system of issuing 'stop notes' gives no reasonable ground for complaint, and the charge of boycotting has not been proved. The rules of the employers' association to be modified so as to make it clear that reports on drivers circulated among its members should be confined to matters of serious importance.

"8. Agreements between employers and drivers, if legally practicable, to be so framed as to bring the drivers within the Workingmen's Compensation Act."

That the traffic regulations at present in force are not suitable to the modern system of transportation by taxicab is the opinion of the court, rendered in a supplement to the award, in which it is advocated that "if the principle of a special license and fare for distant suburbs could be embodied in a practical scheme, advantage might result to the public, the employers and the drivers by the diffusion over a wider area of the present excessive supply of cabs in the more central districts." And further it is noted: "It appears from the evidence that the average takings of a cab are much decreasing, and this is attributed by the drivers to the supply of cabs being in excess of the demand." After consideration as to whether any limitation could be imposed by the licensing authority on the number of cabs licensed, such procedure was deemed inadvisable "in the interest of the public." "While such a limitation would be accepted by the employers," the court said, in conclusion, "the drivers are opposed to it, while the employers object to a limitation of the number of drivers."

Detroit Selected for S. A. E. Meeting.

Detroit finally has been selected as the place for the annual mid-summer meeting of the Society of Automobile Engineers, which has been fixed to occur June 27, 28 and 29. Although there was considerable sentiment in favor of Atlantic City, Asbury Park or some other Eastern seashore resort, Detroit's supremacy, from the industrial standpoint, won the day.

Acetylene That Causes More Heat.

When kerosene lamps are converted to use acetylene, care should be taken to set the new burners as low as possible, the reason being that acetylene creates more heat, which may cause injury.

WHY NEW YORK'S TIRE-DATING BILL

Sheriff Had Trouble and His Legislative Friends Proved Obliging—But Measure Not Likely to Pass.

As the Legislature adjourns to-morrow, and although the bill pending in the New York Legislature which seeks to require the dating of tires under penalty of $50 for each violation has reached the order of final passage, it is not likely to become a law. Senator Roosevelt, who is one of the sponsors of the bill, admitted as much when seen in Albany by a Motor World representative on Tuesday last. The bill was slightly amended on the 20th inst., the amendment in no way affecting its objectionable nature, however, but serving to delay final action.

The introduction of the bill in the New York Legislature was one of the unexpected developments of the legislative session. A similar measure was enacted in Minnesota last year, and one was threatened in Georgia, which facts suggest that the New York bill was inspired by interests unfriendly to the automobile tire manufacturers. If it had been fathered by other than Senator Roosevelt and Assemblyman Chanler, both of whom hail from Dutchess County, it might have been viewed as a "strike" bill, but as these two lawmakers do not rank as "strikers" the wonder grew that they should lend themselves to the support of such an act.

In an endeavor to discover just what was behind the bill, the Motor World man asked Senator Roosevelt point blank who or what had inspired it. His reply brought out how far even the displeasure of a sheriff may reach.

"The bill was suggested by the sheriff of Dutchess County," said the senator. "He had some trouble with the tires on his automobile and stated that he believed it would be a wise thing to have manufacturers put a date on their tires, so that purchasers could see with their own eyes whether they were getting tires that had deteriorated, and were, therefore, more liable than newly made tires to blow up. I accordingly introduced the bill, to which," the senator mildly stated, "I understand there has been considerable objection.

"I am not sure, however, that the bill will go through this year," he added.

Senator Roosevelt has become possessed of the notion that because the bill as amended gives the manufacturers until January 1, 1914, instead of January 1, 1913, as originally proposed, to conform to its requirements, it will not now meet with serious objection.

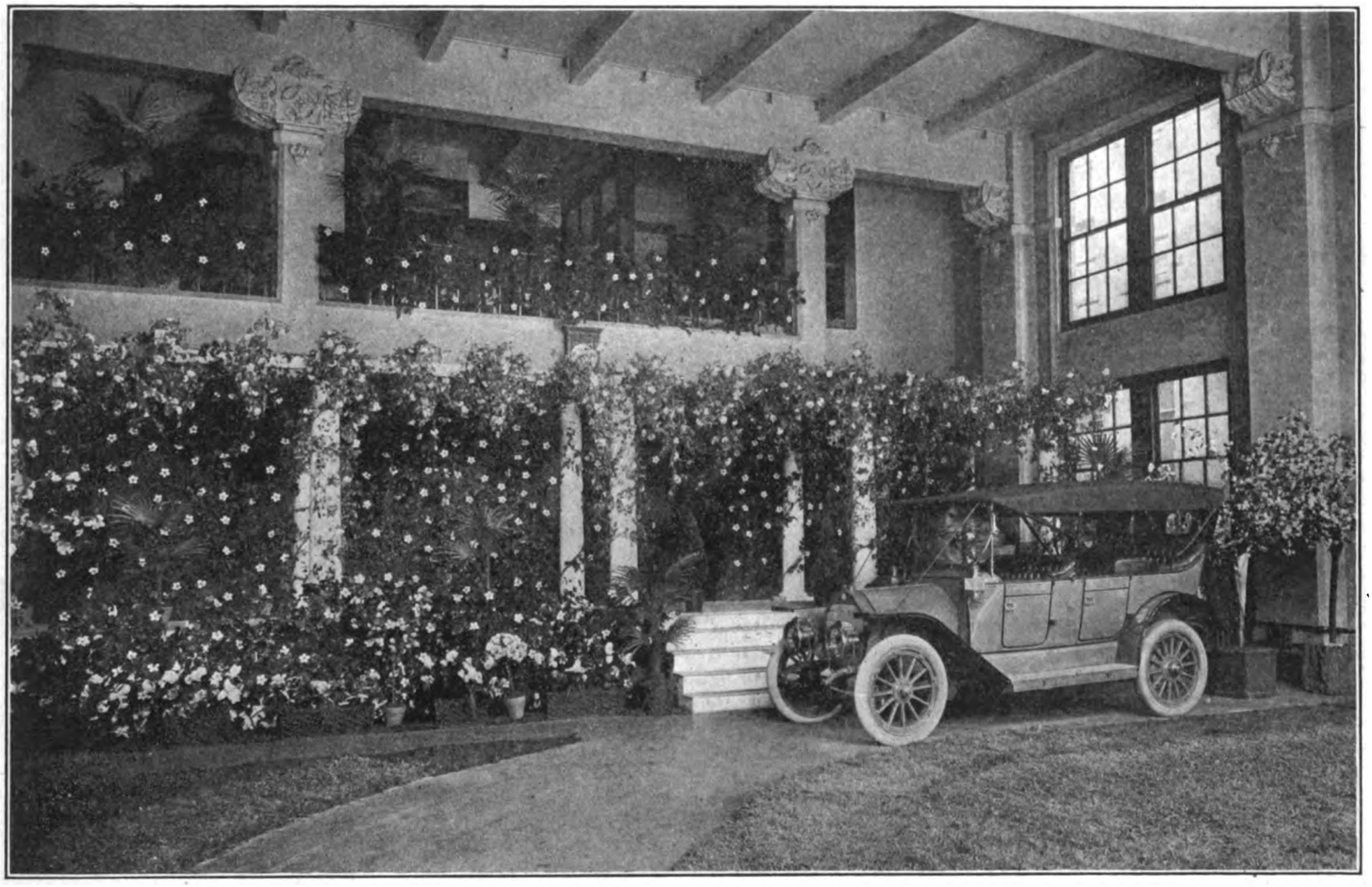
Assemblyman Chanler, who at one time was lieutenant-governor of the State, was not in Albany, but as he, also, hails from Duchess county, his source of inspiration is fairly clear.

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STORE STRIKINGLY TRANSFORMED

Philadelphia Branch Sets a New Mark in Embellishment—Unusual and Enticing "Properties" Charmingly Arranged.

It is not often the interior of a salesroom can be so transformed as to bear a strong resemblance to a suburban scene, with all the correct "properties" of front porch, grass, flowers and so on; but this is exactly what has been done by the United Motor Philadelphia Co. in prosecuting what is styled a "campaign against needlessly high prices for motor cars;" it constitutes a feature of "Saybrook Week." The interior of the salesroom on Broad street has been very cleverly arranged with real blooming flowers, potted plants and other decorative accessories so that, as the accompanying illustration shows, it looks about as little like an automobile salesroom as it is possible for such a place to look. It might be the front of a suburban residence, with a touring car—incidentally, the car is a Stoddard-Dayton Saybrook, and the whole show was arranged as a setting for it—waiting for the family to come out and go for a spin. The piazza steps and the bit of roadway in the foreground add an irresistible touch of realism that is helped out by the grassy bank. Or it might be, as the "landscape gardeners" suggest, a "corner of a shady country estate, showing a real Italian pergola on the knoll of a lawn." Whatever impression the scene makes on the individual beholder, however, the fact remains that the idea is a very clever one and the effect is as attractive as it is unusual and well executed.



STODDARD-DAYTON'S PHILADELPHIA SHOWROOM WITH ITS STRIKING SETTING

"Electrobuses" for Vienna Streets.

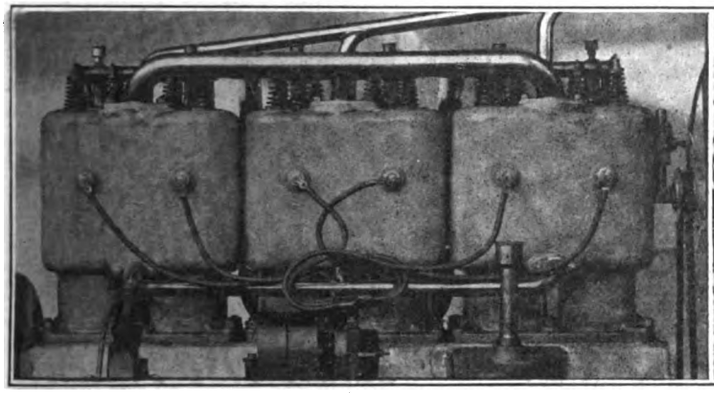
Though the electric vehicle in the concrete is passing through an exceptionally protracted period of adolescense on foreign shores, there is no lack of indications that its development at length has reached to the stage where its genuine merit in certain fields gradually is being realized. The latest indication is the adoption of electric 'buses—"electrobuses," they are styled—of the most improved type for use in the city of Vienna. In adopting "single deckers," the experience of the French Compagnie Generale des Omnibus is reflected, this type of vehicle having been found, after exhaustive tests, to be the most efficient, both as regards passenger-carrying capacity and maintenance. For propulsive power batteries alone are relied upon, these being carried in two trays below the chassis frame. Each tray, which is readily demountable for inspection and charging of the batteries, contains 42 Tudor cells, the total capacity being 244 ampere-hours. The motors are enclosed in the front wheels and are of of the Lohner-Porsche type, as supplied by the Austrian-Daimler Co., which company holds the manufacturing rights for the system. The motors are wound for voltages varying from 160 to 220, and under normal conditions are rated at 15 horsepower each. The wheels are shod with single rubber tires 31 inches in diameter, and weigh approximately 700 pounds each. The battery alone weighs 1,500 pounds, and the combined weight of the chassis and body is 3,950 pounds; with a full quota of passengers the total weight of the 'bus is 9,360 pounds. In springing the vehicle special precautions to eliminate as much as possible the effect of road vibration on the batteries and the passengers have been taken, and to this end the chassis is mounted fore and aft on semi-elliptic springs supplemented by Lemoine pneumatic cushions. For entrance and exit, a single side door is provided and this gives access to two compartments, the rear compartment, where smoking is prohibited, being arranged to seat 10 passengers. The front compartment, where smoking is allowed, accommodates eight more passengers, four seated and four standing.

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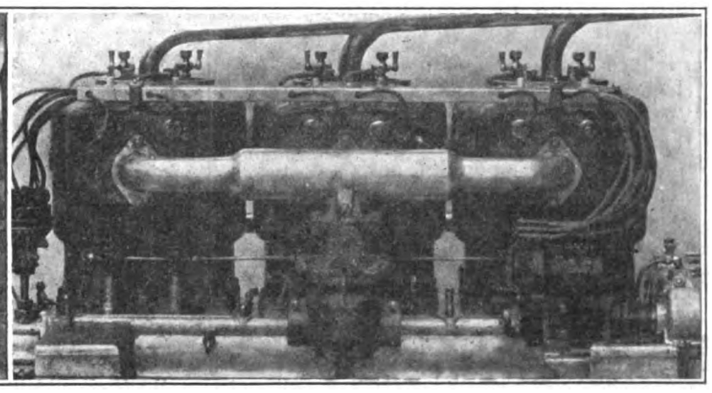
SPARK PLUG LOCATION AND ITS RELATION TO POWER

The Necessity for Flame Propagation of Maximum Rapidity and the Influence of Proper Plug Positioning on Combustion—Loss of Heat and Consequent Lowering of Thermal Efficiency That Is Caused by Poor Locations—Varying Practices in Vogue.

It is probable that there are few who fully realize exactly what ultimate effect the position of the spark plugs may have on the power output of a given engine. Having become accustomed to the location of plugs in one of several positions, and as the manufacture of the plugs themselves has reached such a state of perfection that they seldom require attention, it is perhaps natural that their location in the engine should be taken as a matter of course. But that their position has a definite bearing on power output—to say nothing of smoothness of operation—is a comparatively simple matter to establish and its establishment cannot fail to be of interest.



McFARLAN SPARK PLUG LOCATION



ILLUSTRATIVE OF PALMER & SINGER DESIGN

Because the internal combustion engine is essentially a heat engine it is necessary, in order to obtain the power—and, incidentally, the greatest efficiency—to obtain the maximum permissible degree of heat within the cylinders consistent with the operation of the engine as controlled by the movement of the pistons. If the temperature is too high, either excessive expansion or lack of lubrication, or both, may cause the pistons to stick, and if the temperature is too low power is lost, for the mechanical equivalent of heat is directly proportional to the horsepower.

The British unit of heat, or British thermal unit (B. T. U.), which is the standard as generally recognized, except in France, where the French equivalent, or "calorie," is used, represents the quantity of heat which is required to raise the temperature of one pound of pure water one degree Fahrenheit at or near 39.1 degrees Fahrenheit, which is the temperature at which water is at its maximum density.

The mechanical equivalent of heat is the number of foot-pounds of mechanical energy which is equal to one British thermal unit, heat and mechanical energy being mutually convertible. According to early experiments, those of Joule being made in 1843-50, the mechanical equivalent of one B. T. U. was determined to be 772, which figure is known as Joule's equivalent. Later experiments, however, notably those of Professor Rowland, made in 1880, give higher values, and the most probable average now is considered to be 778.

From which is may be gathered that as one horsepower is equivalent to 33,000 foot-pounds a minute, it also is equivalent to $\frac{33{,}000}{778}$, or 42.416 British thermal units a minute. If it be assumed that a given engine is 100 per cent. thermally efficient, which is impossible, and is capable of delivering exactly one horsepower, then there must be generated in its combustion space 42.416 heat units per minute, or 2,545 heat units per horsepower-hour. If, however, less than 42.416 heat units per minute are generated, then the horsepower will be decreased in direct proportion to the decreased number of heat units generated. For instance: If, due to faulty carburation or ignition, only 40 heat units per minute are generated, then available horsepower (assuming 100 per cent. thermal efficiency) will be represented by the equation $\frac{40 \times 778}{42.416} = 0.733$ horsepower.

Naturally, a great deal depends on carburation. If the gas is too rich, or too poor, it will not burn porperly, and the maximum number of heat units will not be generated. It has been established that the proportions of gasolene and air in the mixture must be determined within comparatively close limits in order to obtain a theoretically perfect mixture. Thanks to the ingenuity of engineers, however, carburetters are about as perfect as they are likely ever to be, and it is not difficult—with considerable patience necessary, in some cases—to obtain proper adjustment.

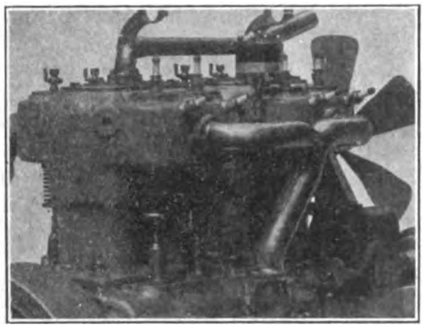
Therefore let it be assumed that carburation is perfect and it may be appreciated that the power output depends to an even greater extent on proper ignition of the charges in the cylinders. Given properly located plugs—the location having been chosen with due regard to the feasibility of obtaining the maximum power under ideal conditions of carburetter adjustment—and an efficient source of ignition current, such, for instance, as a reputable high tension magneto, and even a radically wrong carburetter adjustment will give results of a kind. With badly located plugs, or a weak spark, however, often even the best mixture obtainable cannot be reconciled to the wofully "flat" power output curve, ordinates and abscissas representing the revolutions per minute and the horsepower, respectively.

As a stone thrown into the center of a pond will cause a succession of ripples extending in a circle of ever increasing diameter until the banks are reached, so is the flame propagation in the cylinders of an internal combustion engine. For instance, if the stone be thrown into the exact center of the pond, the distance the ripples will spread in a given time unit will be double the distance they would spread if the stone were thrown near one of the edges. In one case the ripples extend in all directions

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with equal velocity and in the other case the ripples can extend only in one general direction; hence they reach to but half the distance in the same length of time. The propagation of the flame follows the same general principle, and, as is fairly well known, it is not instantaneous.

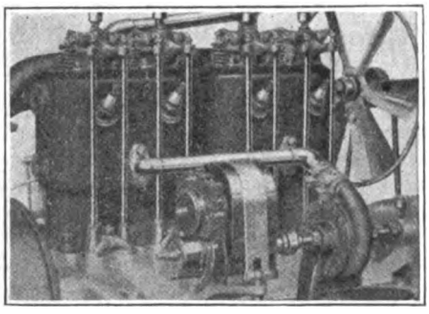
That there is an appreciable length of time between the occurrence of the spark and the combustion of the complete charge in a cylinder has been demonstrated time and again, and it is because of this lag that the location of spark plugs bears such a di-



DISPOSITION OF CORBIN PLUGS

rect influence on power output and thermal efficiency.

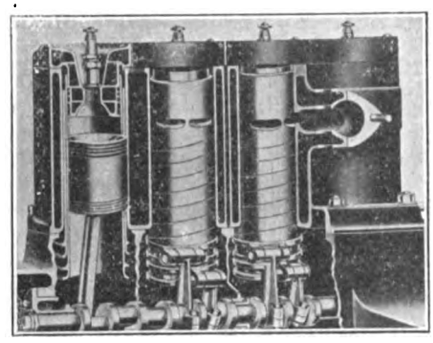
When the mixture is compressed in one of the cylinders of an internal combustion engine a certain amount of power is absorbed in compressing it. It is reasonable to expect, therefore, that part, at least, of that power may be reclaimed, and it is as represented by the proneness of the gas to spread out and again occupy the space



ILLUSTRATING BUICK DESIGN

it occupied before compression; the volume of gas involved, however, remains the same whether it is compressed or uncompressed. But when the gas is ignited its volume is immediately increased and its composition is changed. The combustion of the gas causes the generation of a certain number of heat units, the number varying according to the completeness of combustion and the cubic capacity of the combustion space.

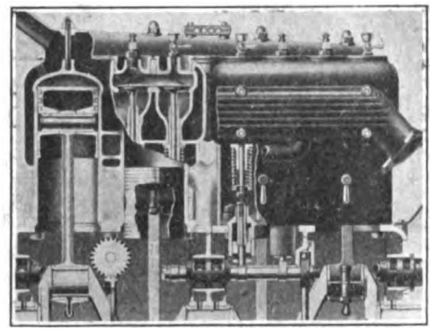
If all the heat units could be converted directly into power then the engine would be 100 per cent. thermally efficient; but they cannot be so converted. When internal combustion engines first became a commercial possibility 16 per cent thermal efficiency was considered to be high; at present, however, from 30 to 40 per cent. thermal efficiency is the average, though as high as 51 per cent. has been obtained in laboratory work. Part of the heat is dissipated into the air and part is absorbed



STEARNS-KNIGHT CENTERED PLUGS

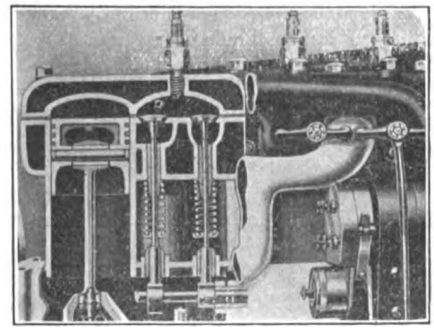
by the cooling water, or the cooling air, as the case may be.

If, however, to obtain, say, 40 horsepower, the engineer allows for the generation of a sufficient number of heat units



MARION PLUGS OVER INTAKES

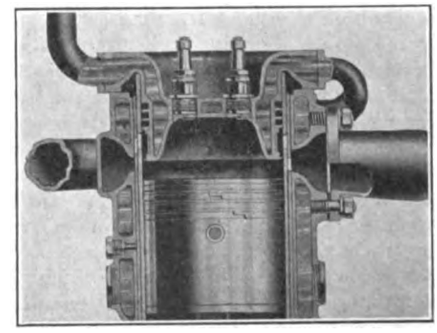
to allow of a loss of, say, 65 per cent., and more than 65 per cent. is lost, through one cause or another, less than 40 horsepower is obtained from the engine. If the carburation is correct, it is up to the



METZ SPARK PLUG ARRANGEMENT

ignition, in that the flame propagation is not rapid enough. At high engine speeds it is quite possible that piston speeds may be high enough to cause burning or unburnt gases to be ejected. In which case it is quite plain that a certain number of heat units which might be utilized are lost and not converted into energy. In other words, assuming the ignition spark to be 100 per cent. efficient, the improper location of spark plugs may be directly responsible for power loss because the flame propagation cannot be as rapid as it might be under better circumstances.

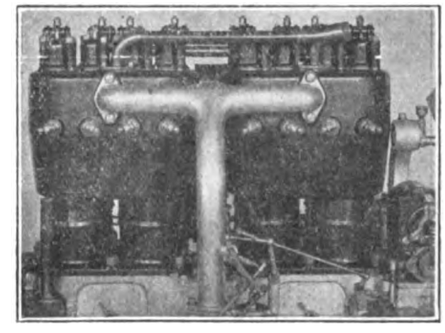
To return to the stone in the pond example, it appears, therefore, that the best possible location for the spark plugs is directly in the center of the combustion space in order that flame propagation may be most rapid. Actual tests have



COLUMBIA-KNIGHT TWIN PLUGS

demonstrated that the more rapid is flame propagation the greater is the power output, within certain limits. For example might be cited the experiments with two-point ignition, the results being an increase in power of as much as 20 per cent. under propitious conditions.

Of course, such lag as there is between the occurrence of the spark and the complete combustion of the mixture always is



POPE-HARTFORD PRACTICE

allowed for, though the method of allowance is in itself a compromise. The spark is timed to take place sufficiently in advance, according to piston speed, to allow of complete combustion by the time the piston has passed top dead center and started its power stroke. From which it may be appreciated that part, at least, of the mixture must be fired before the piston reaches top dead center, in which case part of the inertia of the fly-wheel is absorbed in overcoming the power of that part of the mixture which has been burned.

Consequently, the more rapid the flame propagation is the less in advance will the spark be required to be timed, and a greater proportion of energy will be con-

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verted to useful purposes. Hence, it is desirable that flame propagation be as rapid as possible if the maximum power is to be obtained, and, as has already been pointed out, the position of the plugs bears a definite relation to flame propagation.

The central ignition of charges is not a new idea; it has been advocated before, though up to to the present time very few manufacturers have so constructed their engines that plugs may be centrally located. Practically the only exponents of the system at present are to be found in the ranks of the manufacturers of Knight engines. In the Stearns-Knight, for instance, a single plug is located directly in the center of the combustion space, as shown in the accompanying illustration. In Columbia-Knight engines, however, a slightly larger space is available, and two plugs are inserted in each cylinder head. Either of them is sufficiently near to the center of the combustion space to be considered in the center for all practical purposes. It seems within reason that part, at least, of the extra power per cubic inch of gas fired that is shown by Knight engines may be traced directly to the central location of the spark plugs.

Because the T-head or L-head type of cylinders are the most popular, as involving, possibly, the least mechanical complication in construction of the valve parts, and as the water outlet almost invariably is placed on top of the cylinders, spark plugs have come to be located over the valve pockets, in many cases in the valve pockets, quite as a matter of course. But there is another reason for such locations, and in particular for the location of the plugs over the intake valves. The plugs operate under very adverse conditions; half the time they are subjected to the intense heat of the burning gases, and unless they are cooled as much as possible are likely to become so hot as to cause pre-ignition. When they are placed over the intake valves, however, the cool in-rushing gas reduces their temperature.

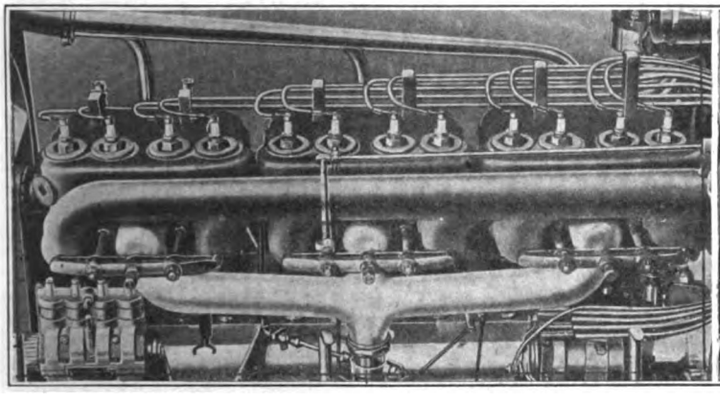
Typical examples of such plug locations may be found in a very great many cars, two which exemplify the general construction being shown herewith. In the Mitchell engine there are but six plugs for the six cylinders, and close examination of the picture will reveal that in each case the plugs are located over the intake valves. Incidentally, this location insures that the sparking points will be in contact with "live" gas after the induction stroke. In the Winton engine, which is shown beside the Mitchell and is also of the six-cylinder variety, twelve plugs are used. Each set of six is used independently, the set over the intake valves serving for ignition by means of the magneto, as under normal running conditions, and the other set operating through the medium of a battery.

When inserting new plugs in an engine great care should be taken to see that the points do not protrude too far and that they do not approximate the other extreme in their location at the end of a deep recess in the valve caps. In the first case there is danger of pre-ignition, for the reason that the protruding shell of the plug is not in contact with the cooled metal of the cylinder head. In the second place, ignition may be faulty, because it is practically impossible for "live" gas to reach to the spark points. For the best possible results the plug points should protrude just beyond the valve cap or the cylinder wall, as the case may be. The Marion engine, illustrated herewith, partly sectioned, shows a representative plug location, the plugs being over the intake valves and exactly "fitting" the valve caps. In the Metz arrangement, the location of the plugs is equally good. As there are no valve caps, the whole cylinder head being removable, the plugs have been arbitrarily placed over both valves and between them. Corbin construction is an interesting example of the faith of the manufacturer in the efficacy of locating the plugs over the intake valves. In this case the service plugs are located in the orthodox position in the valve caps and the reserve, or battery set, is located at an angle projecting into the intake valve pockets.

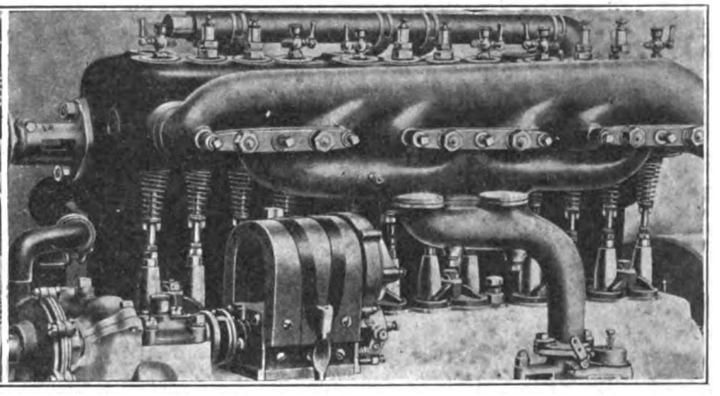
Naturally, when valves are of the overhead type, and, with the water outlet connections, occupy all the available space on top of the cylinders, it is necessary to find some other location for the plugs, and the general practice is to tap through the water jacket and cylinder wall so as to admit the plugs horizontally into the combustion space from the sides. Such construction is embodied in the McFarlan engine, illustrated herewith, and in several others. This method of cylinder construction is not entirely confined to manufacturers of "valve-in-the-head" motors, however. As a representative of the T-head type motor, with the plugs set horizontally into the valve pockets, the Palmer & Singer motor is not quite, though almost, alone.

In the Pope-Hartford motor the method of arranging the plugs is quite similar to that used in the McFarlan, except that they are placed at a slight angle to the axis of the pistons, the reason being to obtain somewhat greater accessibility and to facilitate their removal. Slightly different, the location of the plugs in the Buick engines still follows the same general plan, though there is a clever theory involved in the unusual angle at which they are set. Heretofore they have been set horizontally, but after considerable experimenting it was determined that setting them at an angle reduced to the minimum the probability of lubricating oil or soot remaining on the spark points for any length of time.

It is obvious, of course, that spark plugs should be so located as to be readily accessible, for despite the fact that they are practically infallible in their present perfected forms, it is essential that they be easily and quickly removable, without the necessity for recourse to special tools which may or may not be in the tool kit when it is urgent that a plug be changed. It is perfectly true that there may come a day when the necessity for the spark plug will be no more—the answer is to be found in the Diesel engine, which uses no other source of ignition than the heat of compression—but that day is long removed. In the meantime, the spark plug will continue to occupy its particular niche in the scheme of things pertaining to automobiles, and though it scarcely can be expected that further improvements in the plugs themselves will be made, it is not unlikely that the future will see greater attention paid to the location of plugs in the cylinders.



WINTON PLUGS OVER ALL VALVES



MITCHELL PLUGS OVER INTAKE VALVES

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INCENSE BURNED AT KANSAS SHOW

Wichita's Exhibition Novel in More Than One Sense—Both the Eye and the Nose Were "Tickled."

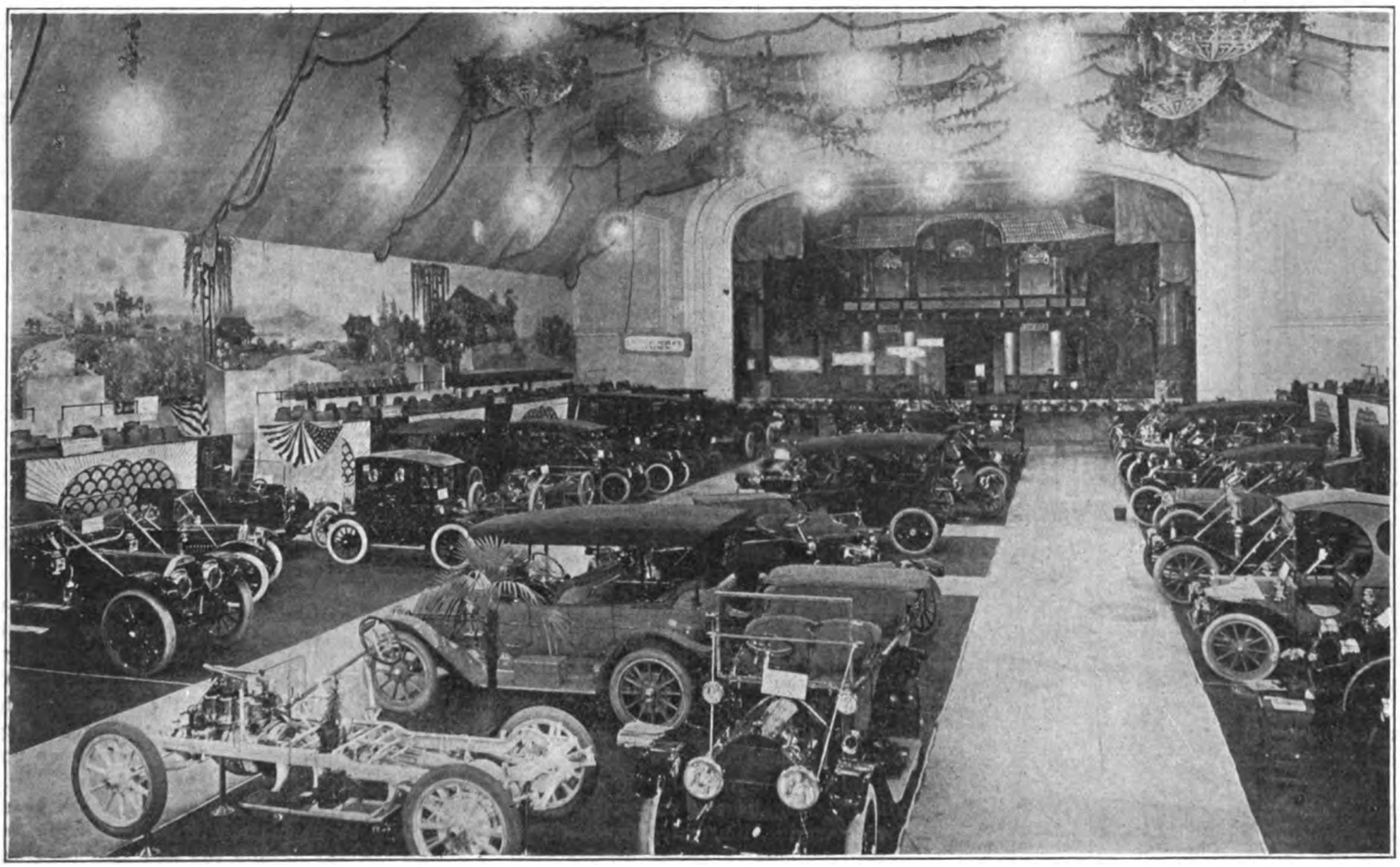
If a pretty setting and a realistic setting were the only requisites of a successful automobile show, the Wichita (Kan.) Business Association certainly had smooth sailing with its first annual exhibit, which was launched in the Wichita Forum during the week March 18th to 23d. But the decorations, which really were beautiful, did not eclipse the display of motor cars, trucks and accessories. There were too many of them to be eclipsed—from one to three of each of the 27 different makes which were staged by 19 exhibitors of motor vehicles, while all varieties of supplies and accessories were on hand, shown by the dozen equipment dealers.

The more or less inclement weather which prevailed throughout the week had very little or no effect on the attendance; indeed, it seemed as if the gentle spring showers but enhanced the beauty of the Japanese garden setting, the brightness and freshness of which offered a decided contrast to the murky darkness reigning outside of the four walls of the building. The arena was well illuminated with the soft glow which issued from numerous chandeliers, which took the form of massive flower-laden baskets, and which extended in two rows through the length of the room. Garlands of smilax and wild moss, the streamers of delicately tinted Japanese bunting extended from each of the luminous flower baskets to the nearest chandeliers on one side and to the ceiling on the other side. The huge canvas panel which surrounded the whole arena save on the side occupied by the stage depicted various and interesting Oriental scenes.

Music, which was furnished by Bamberger's orchestra, issued intermittently from the truly Oriental structure which occupied the major portion of the stage, the joss house. The touch of realism which was felt by each of the visitors was not, however, gained in its entirety through the sense of sight. The mingled odors of the brewing Japanese national drink which prevailed in the vicinity of a small tea house which shared the stage with the other structure, and the burning incense issuing from the joss house, too, had their effect.

The exhibitors were as follows: International Harvester Co., International commercial; Arnold Automobile Co., Auburn; Studebaker Corporation, E-M-F and Flanders; George W. Lewis, Mitchell; Cadillac Service Station, Cadillac; J. I. Case Threshing Machine Co., Case; Wichita-Overland Co., Overland and Hudson; Velie Motor Sales Co., Velie; Peru-Van Zant Co., Marathon; J. M. Kirkwood, Oldsmobile, Paige-Detroit, Lexington and Hupp-Yeats electric; J. Arch Butts, Buick; Anderson Electric Car Co., Detroit electric; G. A. Jones, R-C-H and Wichita Falls truck; Wichita Automobile Co., Pierce-Arrow, Chalmers, Reo and Waverley electric; Gordon Oldham, Stearns; Mason Motor Car Co., Mason; Regal Motor Sales Co., Regal; Baker Motor Vehicle Co., Baker electric; Westcott Motor Co., Westcott.

The accessory exhibitors were: Vehicle Supply Co., Uncle Sam Oil Co., Hockaday Supply Co., National Oil Refining Co., Auto Tire Filler Co., Hays-Wayne Pump Line Co., G. A. Fralich Supply Co., Auto Top Co., J. Arch Butts, Wichita Auto Garage, Auto Supply Co., Walker Bros.



WICHITA'S HANDSOME SHOW INCLUDING THE JOSS HOUSE BUT MINUS THE INCENSE

Carbon That Causes Increased Power.

Carbon deposit in the combustion spaces of a motor may not always make its presence felt by reason of loss of power and knocks. On the contrary, the symptom may be an increase of power and accelerative properties, the reason being that the combustion space is slightly decreased in volume, causing higher compression and, within certain limits, greater power. As a general rule, such symptoms may be taken to mean that a small accumulation of carbon exists and care should be taken to remove it. If it is not removed it will increase rapidly and the symptoms will change to knocks and serious loss of power.

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CUT-OUT'S WORTHLESSNESS PROVEN

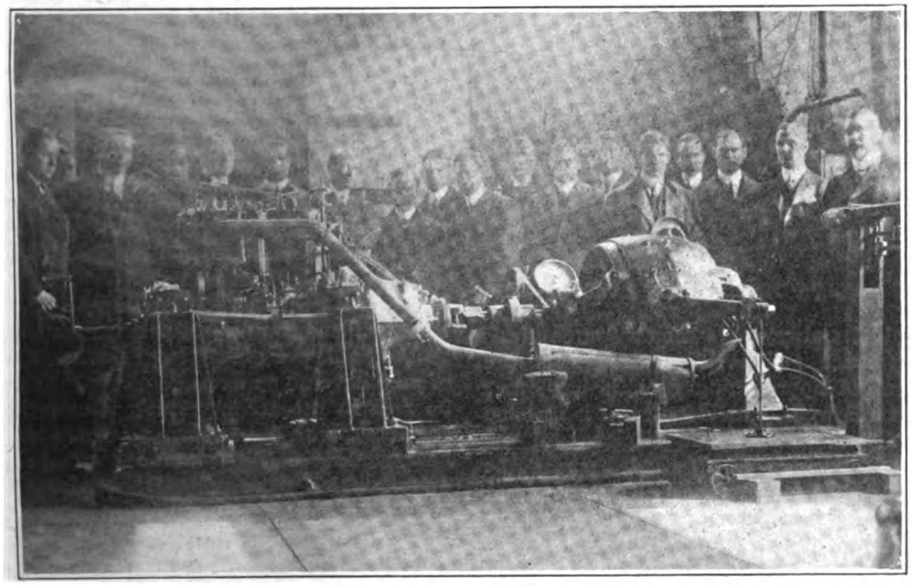
Laboratory Test Emphasizes Belief That Its Chief Service is to Create Noise—The Testing Apparatus Employed.

Confirmation of the belief and knowledge that not only is the cut-out unnecessary with an efficient muffler, but it makes so little difference in the power available as to make its use unwarranted, was the chief result of tests made one day last week at the laboratory of Joseph Tracy, at Rutherford, N. J., under the auspices of the so-called Touring Club of America.

The tests were made with a Packard 30 horsepower motor of stock pattern, with the regular Packard muffler. The testing apparatus consisted of a dynamo, to which the motor was direct connected by means of a jointed shaft, having a field casting that was mounted in bearings which would permit it rotate if not checked. An arm attached to the field casting rested on the platform of a scale. When the motor was running the current generated was absorbed by a resistance, and the magnetic drag of the armature on the field caused the latter to exert a pressure through the projecting arm on the scale, the pressure being at all times in proportion to the power developed by the motor. Readings were taken at speeds varing from 300 revolutions per minute to 1,800 revolutions per minute, beginning at the lower figure and increasing by steps of 100 revolutions per minute. The figures first given out as the result of the test were of necessity somewhat hastily compiled, and a subsequent checking with the curves plotted gave slightly different results. In fact, the test was so hastily arranged as a publicity stunt for the so-called Touring Club that it was by no means satisfactory. As the appended table shows, however, there still remain some curious figures, which seem to indicate that there are some speeds at which the power output of the motor was actually greater with the muffler cut-out closed than with it open.

Muffler Cut-Out Test.

Revolutions per minute.	Cut-out Closed. Weight.	H.P.	Cut-out Open. Weight.	H.P.
300.....	58.50	13.37	59.50	13.60
400.....	59.00	17.98	58.50	17.83
500.....	58.50	22.28	59.50	22.69
600.....	59.00	26.97	50.00	26.97
700.....	59.50	31.73	60.00	32.00
800.....	57.50	35.05	60.00	36.57
900.....	56.00	38.40	59.00	40.46
1,000.....	56.50	43.05	55.00	41.91
1,100.....	54.50	45.66	54.00	45.26
1,200.....	52.50	48.00	50.00	45.72
1,300.....	48.00	47.50	49.00	48.53
1,400.....	47.00	50.13	47.00	50.13
1,500.....	40.00	45.72	44.00	50.29
1,600.....	38.00	46.32	42.00	51.20
1,700.....	35.00	45.33	37.50	48.57
1,800.....	34.50	47.32	35.00	48.00



TESTING THE MUFFLER CUT-OUT IN THE TRACY LABORATORY

To Remove Dents from Copper Piping.

Where copper piping is used in the make-up of either the intake manifold or the water circulating system, a dent not only mars the appearance, but may perchance cause more or less trouble by reason of the reduced effective cross section of the pipe. If the pipe is a straight one the dent can be readily removed by inserting a cylinder of hard wood, the diameter of which is slightly less than the inside diameter of the pipe, and by gentle force tapping it past the dented portion. When "L" or other bends are present this method cannot be applied. The best way is to plug up one end of the pipe with a hard wood plug. Run the pipe full of an alloy made of 8 parts of lead, 15 parts of bismuth and 2 parts of mercury, and when it has ocoled so that the filler is in a plastic state gently tap the alloy. This will force out the dented portion, after which the metal can readily be removed by remelting.

BEAVER ADDS BLOCK-TYPE MOTOR

Wisconsin Makers Depart from Previous Practice—New Engine Has Long Stroke and Discloses Ingenuity.

Supplementing an already extensive line of motors and unit power plants, the Beaver Mfg. Co., of Milwaukee, Wis., has added still another model which bears all the ear-marks of Beaver quality but which it just a step in advance of other models in that it reflects the very latest engineering practice, which means the greatest possible simplicity consistent with the functions which must be performed; accessibility follows as a matter of course. The new motor is of the true long-stroke type, the four cylinders being cast in a single block and measuring 3½ inches bore and 5 inches stroke.

Carrying the system of block casting a little further than is usual, only one other American motor being so constructed, the top half of the crank case is cast integral with the cylinders, which eliminates the possibility of lubricating oil seeping through between the base of the cylinders and the crank case, and therefore conduces to cleanliness and economy of oil. Solidity of construction also is increased, of course. The crank shaft is of the two-bearing type, the main bearings as well as those of the connecting rods being of exceptional size. The crank shaft itself is forged from a solid billet of carbon steel, and is two inches in diameter. Reflecting the simplicity which has been aimed at and achieved, the water circulation pump has been eliminated, cooling being effected by the thermo-siphon system, the theory being that this system is more efficient by reason of the fact that the water does not commence to circulate until the motor has become warmed up. Thereafter the water is maintained in circulation, and consequently cooled, according to the heat of the engine. Lubrication is effected by means of the constant level splash system operating on the vacuum principle, the oil reservoirs being cast integral with the lower half of the crank case; they are of ample capacity for 300 miles' running, under normal conditions.

Particular pains have been taken to ensure quietness of action, and to this end the valves and their method of actuation have been given a greater amount of attention than is usual. In the first place, the cooling water circulates completely around the valve heads and stems, which is in itself a practical assurance of quietness, inasmuch as the water tends to deaden sounds. Rather than deaden the sounds, however, the designer has sought to eliminate the cause of unnecessary noises by properly proportioning the weight of the valves, the spring pressures

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and, in particular, the shape of the valve cams. The cams and the cam shaft are forged integral and the cam faces have very small radii, which makes for quietness; the radii of the cam noses, however, are liberal, and ensure quick opening and closing, with large, unobstructed passages for the gases. Another of the distinctively up-to-date practices in use involves the construction of the intake and exhaust manifolds, which are cast integral, thus ensuring thorough warming of the unburned gases and a consequent partial cooling of the exhaust gases. The manifold itself, however, is separate from the cylinder casting, in order to eliminate the possibility of unequal distortion of the several cylinders.

Clutch Leathers Not "Finished Parts."

In sustaining a claim filed by Bolts & Brothers, importers of leather materials, the Board of United States Appraisers holds that strips of leather for use as "clutch leathers" are not to be regarded under the tariff act of 1909 as "finished parts of automobiles." The Collector of the Port of New York considered them such, and accordingly exacted duty at the rate of 45 per cent. It was his opinion that the strips were complete manufactures, ready for use.

The importers denied this and submitted expert testimony to the effect that the strips, before being fitted to the clutch cones, have to be soaked in water for twenty-four hours, trimmed down to fit, and made rough so as to incite friction. Attorneys for the Department of Justice failed to controvert the importers' testimony, although the board granted an additional thirty days for the purpose. Judge Fischer sustains the contention of the importers for duty at the rate of 15 per cent., under the provisions for "leather cut into forms suitable for conversion into manufactured articles." The Collector was reversed and ordered to reliquidate the duties.

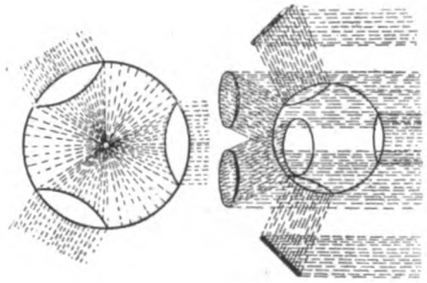
To Repair Broken Battery Connections.

Without the proper tools and equipment lead burning is an impossibility, and even with all the requisites, unless the operator is proficient, not a little trouble is experienced. When the storage battery lugs become disconnected, if the operator is either inexperienced or without the proper facilities to burn them together, it is well to resort to autogenoous welding, which is really not so complex as the name seems to indicate and can readily be carried out by anyone who can hold a soldering bit. It suffices to clean the lead lugs thoroughly by scraping and apply a layer of lead amalgam, which is a mixture of lead and mercury. Pass the heated iron across the amalgam and the union is complete. Care should be taken to see that none of the melted lead drops into the battery or on the sealing material.

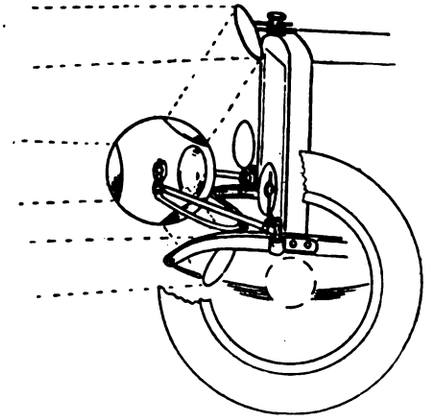
ONE BULB EQUALS FIVE LAMPS

At Least That is the Claim Made for the Diva Device—Headlight of Extremely Radical Design.

To make one lamp perform the functions of two, or, rather of five, has been the object of a British inventor in bringing out a lighting system which is by far the most unique of its kind that has been evolved in along time. Though the principal purpose of the new system, which is styled the "Diva," and is marketed by the Diva Headlight Co., of Bradford, England, is to eliminate the glare which with ordinary lights always has been a source of inconvenience and even of danger to the drivers of approaching cars, it has other virtues as well. For instance, it is claimed actually to increase the efficiency of the car to which it is attached because the shape of the lamp causes a draft of air to impinge on the center of the radiator where the action of the fan is least felt!



DIVA HEADLIGHT RAYS



DIVA SYSTEM IN PLACE

In its simplest aspect the new system consists of a spherical lamp which contains an electric bulb, preferably of six or eight volt size, though nothing is said of the candlepower, and a series of four mirrors. Set into the spherical shell are five lenses, one of them being directly in the center at the front and serving to direct the light rays forward, and the other four being so placed in the rear of the shell that they cause the light rays to impinge on the four mirrors which are attached to the shell by means of extension arms. When the lamp is lighted the shell becomes a veritable "ball of light;" by arranging the angle of the several mirrors the light may be directed at the will of the driver. Once set, however, the adjutsment cannot be changed from the seat.

One of the interesting features of the system is that by reason of the shape and focus of the lenses the rays given off are parallel, which, it is claimed by the manufacturer, is responsible in no small measure for the exceptional illuminative power of the system. In other words, the rays all are put to some useful purpose and are not wasted by diffusion upward and to the sides. Another interesting feature is in the construction of the special bulb which is supplied with the system. In it two metallic filaments are used and, contrary to usual practice, they are connected in parallel instead of in series. Thus, if one filament should become ruptured the other would continue to burn and the efficiency of the lamp therefore would be only partly impaired.

Though it might be supposed that rain or mud on either of the lenses or the mirrors would cause a serious loss of reflecting powers, it is claimed that such is not the case, the explanation given being that by reason of the superior shape of the reflectors and lenses and the utilization of all the light, even fairly large incrustations of mud have no appreciable effect. As may be seen in the accompanying illustrations, the lamp, with its mirrors, is intended to be attached centrally in front of the radiator, which quite naturally obviates the possibility of using the starting crank. To allow of the use of this necessary adjunct, however, the whole system is mounted on a swinging bracket and may be moved out to one side temporarily. In the newest form light, the lenses are so ground that rectangular instead of circular beams of light are projected.

Concerning Holes in Cylinders.

Locating a sand hole in a cylinder casting is not always a simple matter, and other expedients besides simple inspection must sometimes be resorted to, especially if the crevice is of "pin hole" size. The method most generally employed embodies the plugging of one of the inlets to the water jacket and the introduction of water under pressure through the other, when the hole can be easily located by the fine stream of water which will spurt out. If the hole is so fine that the water issues very slowly in the form of small drops, it is best to leave it alone, for it is certain that when the motor is running the hole will be still smaller. If, however, the hole is large enough to work a negative effect, a piece can be cut out of the water jacket large enough to permit a piece of iron to be welded into the flaw. The inside of the cylinder should then be touched up on a grinder to smooth down the high spot, and the opening in the jacket closed with a plate.

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GOVERNING THE ELECTRIC LIGHTING SYSTEM

The Chief Problem that was Encountered and Overcome — Effects of Varying Speeds of Automobile Motors and Many Fluctuations of Battery Voltage and What They Entail—Two General Methods with Distinctive Variations that are Followed.

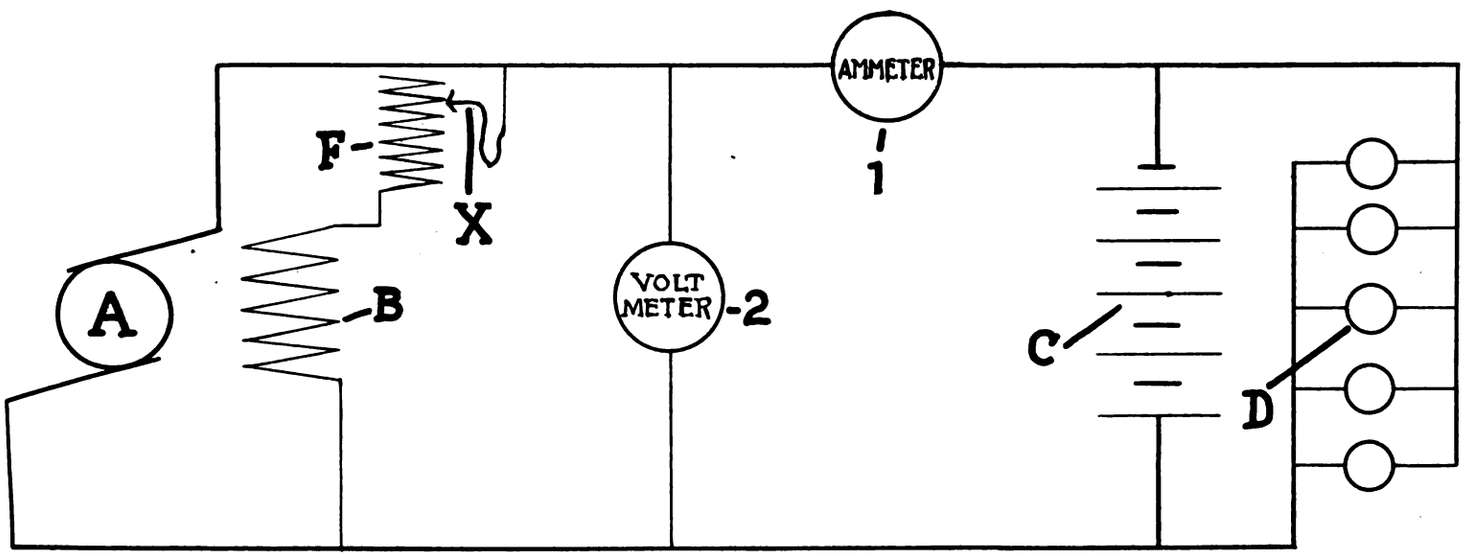
If the "lighting up" operations under the old system, with acetylene headlights, and oil side and tail lamps, had been confined to the simple striking of a single match and the illumination of one burner, it is doubtful if the newer order, the electric lighting system, would have come so rapidly into favor. When the conditions under which the lighting up operations are conducted are considered—a muddy road, a fitful breeze which seems to blow from all points of the compass at the same moment, several matches so impregnated with moisture by virtue of the damp night air that they might as well be headless, and three oil lamps one of which is covered with mud and two gas lamps to be lighted— it is not at all surprising that the electric system with its extreme simplicity and convenience of operation should be, colloquially speaking, "all the rage." Though the operation of depressing a couple of push buttons seems like the very acme of simplicity, this lack of complexity has only been attained after the expenditure of much time and thought on the part of the designer in the solving of such problems as the production of a constant voltage by a dynamo driven from an engine the speed of which constantly varies within very wide limits.

It is just here that designers and engineers found the greatest problem of all; to generate current is easy but to so govern the source of generation that the amount of current given off, and its voltage, shall remain constant within narrow limits has been the rock upon which such systems split.

Fortunately, however, there are many ways in which positive governing of the generator output can be effected—they are immutable laws in the science of electricity —and though it has required continual study and research positively to harness them to the needs of man as exemplified in the automobile generating and current storage system, which must be at once small, compact and sturdy, no small measure of success has been achieved. But the fact remains that the slow development of electric lighting systems for motor cars can be traced in the main directly to the one problem of insuring positive regulation of the generator.

The condition of the battery as to charge and discharge, and the number of lamps in use at any given time, obviously are factors in the maintenance of a constant voltage; the production of a suitable switch to disconnect the dynamo from the battery when the voltage of the dynamo is lower than that of the battery is of course a necessity.

Probably the simplest means of obtaining constant voltage from a dynamo driven from a variable speed motor is to limit the speed of the dynamo, voltage fluctuation taking place only when the speed of the motor is below that necessary to produce this maximum rotation of the armature. This maintenance of constant speed is readily attainable in several various ways, the most simple of which is the employment of a clutch either of the friction or magnetic type between the driven pulley and the armature shaft. It is evident that a dynamo which develops its full output at low speeds, or a high speed dynamo geared quite high in relation to the crank shaft, will produce a constant voltage over a great range of car speeds. The friction clutch is the type most generally employed, the relative position of the faces of the clutch being controlled so as to allow slipping or positive engagement at different motor speeds. This is generally accomplished by a centrifugal governor acting against a spring.



DIAGRAMMATIC SKETCH SHOWING METHODS OF VOLTAGE AND CURRENT REGULATION

The storage batteries generally used in conjunction with the car lighting systems have as characteristics:

(1) Low internal resistance.

(2) Practically constant voltage during charge or discharge at the normal battery rate.

(3) Approaching a charged condition the voltage rises abruptly, often necessitating an increase of between 25 and 30 per cent. in the dynamo voltage in order to maintain the charging rate normal.

These inherent characteristics influence the design of the governing apparatus. Where a constant speed generator is used it is quite evident that the batteries cannot overcharge, for the gradual rise in the battery voltage automatically cuts down the charging current, and the decided increase

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in the battery voltage at the time when the battery is very nearly charged tends to render the charging current nil. Some provision for limiting the charging current when the batteries are discharged is of course necessary, for otherwise the very low internal resistance would allow of the passage of sufficient current to injure the battery plates to a greater or less degree.

In the lighting system made by Gray & Davis, of Amesbury, Mass., provision is made to prevent the increase of the charging rate of the battery above a maximum by shunting the field of the dynamo when the batteries are being charged; when the dynamo is carrying only the light load, it is compound wound. The centrifugal governor on the clutch allows the armature to rotate at 1,200 revolutions a minute, which armature speed is attained at moderate car speeds; constant voltage thus is assured, save when starting or stopping or driving in traffic. The automatic switch which cuts in the dynamo when the voltage has reached its limit, and out again when it has dropped below that of the battery, is actuated by means of an electro-magnet wound with differential coils. The coil which closes the switch is wound with coarser wire than the second coil, for it is designed to exert its pull on the full voltage of the dynamo while the latter works on the slight return current forced through the dynamo by the higher voltage of the battery as the dynamo speed is decreased. The dynamo and clutch are cooled by a current of air set in motion by fan blades cast on the face of the clutch discs. A battery of rather small capacity is used with this system, its usefulness being confined to the maintenance of the illumination at times when the motor is inoperative..

The choice of a battery depends primarily upon the conditions under which the system works; if the conditions necessitate burning the lights during prolonged periods with the motor at a standstill, a battery of rather large capacity is naturally essential. Under all conditions, however, the battery should be as small as to insure the relation between the periods of charge discharge being as nearly equal as possible, for it is only when such is the case that the battery is working under the best conditions.

In cases where the dynamo speed is not held constant, some means for maintaining a constant output must be resorted to. By far the most common method of decreasing the output is by changing the strength of the dynamo field; the methods of effecting this change of strength are, however, widely divergent; some are mechanical, some are a combination of mechanisal and electrical pure and simple.

No matter what form the governing apparatus takes in its final development, whether the field strength is varied by the insertion of resistance in circuit with it or by the action of a "bucking" field which tends to counteract the magnetic effects of the main field, the amount of variation is always proportional to (1) the change of the potential difference across the brushes of the dynamo or (2) the current output of the machine. In Fig. 1, A is a dynamo driven at variable speed; B is the field of the dynamo and is adjustable by means of the variable resistance F, and the slider X; C is a battery "floated across the line"; D represents the working circuit of lamps. 1 and 2 are ammeter and voltmeter, respectively, connected in the usual way so as to indicate the total output of the dynamo in amperes and volts.

If the voltmeter is watched the voltage during speed changes of the machine can be kept constant by altering the position of the slider X, thereby increasing the strength of the field as the speed of the machine decreases and decreasing the strength when the speed increases. It is obvious then that the amount of current flowing at any time is dependent only on the resistance in the line, or in other words, on the state of the battery and the number of lamps burning. This method of regulation is styled voltage regulation. It has been and is now used in many very successful lighting systems, and has two valuable functions: The charging rate of the battery is automatically decreased as the battery voltage is increased, and the current supplied to the lamps being a function of the voltage, is always constant. Broadly speaking, the voltage regulated system is in the same class with the system wherein the armature speed is controlled or limited, for in both systems the voltage is held constant, though the means employed are different. The one drawback, which, however, is easily overcome by properly proportioning the capacity of the battery to the time of operation of the lighting system, is that if the battery voltage is very low heavy currents are sent through the battery which are liable to work injury. This objection is very readily removed by simply supplying a battery of sufficient capacity to carry the lights for several hours without any very noticeable drop in voltage when the motor is inoperative.

While it is by no means impossible to render the movement of the slider automatic by means of a solenoid provided with a voltage, or fine wound, coil connected in shunt across the line, in practice much better results are obtained in systems wherein the number of moving parts has been reduced to the minimum. The general tendency where voltage regulation is adhered to is to render the dynamo self-regulating so that the voltage is held practically constant during speed changes, and this very desirable end is achieved without the aid of any movable parts, by taking advantage of the property of self induction which is present in all dynamos, and which tends to cut down the output as the speed of the armature increases. With the dynamo of ordinary design, however, this counteracting influence does not increase with as great rapidity as the voltage increases during a given speed increase, and as a consequence a rise in voltage is the result. By specially designing the machine it is possible to make the increase of self induction balance the increase of voltage and thus the latter is held constant. Such machines are now on the market and are manufactured by the Wagner Electric Manufacturing Co., of St. Louis, and the Holzer-Cabot Electric Co., of Brookline, Mass. In the latter system the effects of self-induction are increased by lengthening the tips of the pole shoes. In both systems the dynamos are shunt wound.

Referring to the figure again, it is obvious that by watching the ammeter, the variable resistance can be regulated so that the current output is constant, although the voltage necessary to maintain this constant current may increase or decrease according to the dynamo speed. This method of regulation is current regulation, and is used extensively in practice, the field strength being varied in various ways. The virtues of the system are many, chief among which are the constant current which is always supplied to the working circuit, and the constant charging rate which precludes the possibility of battery plate injury due to too high charging rates when the battery is in a discharged condition. As is the case with the voltage regulated machines, the general practice is to eliminate moving parts insofar as is consistent with good regulation; where moving parts are used they are made light so as to render the effects of inertia as small as possible. In the Rushmore system, designed by the Rushmore Dynamo Works, of Plainfield, N. J., the strength of the field is controlled by the current output without the aid of any mechanical devices whatever. The field magnets are wound with a main field coil, which is connected in shunt, and a "bucking" coil which is connected in series with the armature but is shunted with a coil of heavy iron wire. When the current is low the iron coil is cold and its resistance quite a bit lower than the resistance of the supplementary field coil; when the current value rises, however, the iron heats slightly and after having reached a temperature just below red heat its resistance increases very quickly. Being connected in shunt with the bucking field, the greater resistance of the iron wire coil forces more current through the supplementary field and the strength of the magnetic field thus is lessened.

The Aplco, the product of the Apple Electric Co., of Dayton, Ohio, and also the system manufactured by the Remy Electric Co., of Anderson, Ind., are similar in that they both use automatic relays operated by current coils, which coils tend to pull an armature against the pressure of a spring and so introduce resistance into the field circuit. In both, the fields are singly wound. The resistances are made up of piles of carbon disks compressed by a spring, the pull of the electromagnetic coil

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lessens the tension of the spring and consequently the current value rises.

The Ward Leonard system, manufactured by the Ward Leonard Electric Co., of Bronxville, N. Y., also has an automatic field rheostat, which, however, is novel in that there is but one step of resistance introduced by the current coil when a predetermined current strength has been reached in the line. When the current value falls below this predetermined value the resistance is shunted out. The Deaco system, which is also of the current regulated type, and is the product of the Detroit Electric Appliance Co., employs a permanent magnetic field which is either increased or decreased by a variable electromagnetic field, the connections of which are changed according to the current in the line. When the current value is small the electromagnetic field is connected in shunt across the brushes in such a manner that it assists the permanent field. As the current value rises the connections are first broken, then reversed with a resistance inserted so that the electromagnetic field is bucking the permanent field, and as the current value is still further increased the resistance is shunted and the action of the permanent field is counteracted by the effects of the variable field. The various connections are made and changed by the action of two electromagnets which act on two armatures against the tension of springs. By varying the tension of the springs the current output of the machine may either be increased or decreased

The Vesta Accumulator Co.'s system embraces a method of governing which is unique. Instead of governing the output of the dynamo, as is the case with all of the other governing systems extant, the governor of the Vesta system controls the ingress of current into the working and battery circuit. The armature shaft is fitted with a governor of the centrifugal type which introduces resistance in steps as the speed of the machine is increased. Thus the resistance of the line is increased as the voltage is increased and the current value in the line is practically constant.

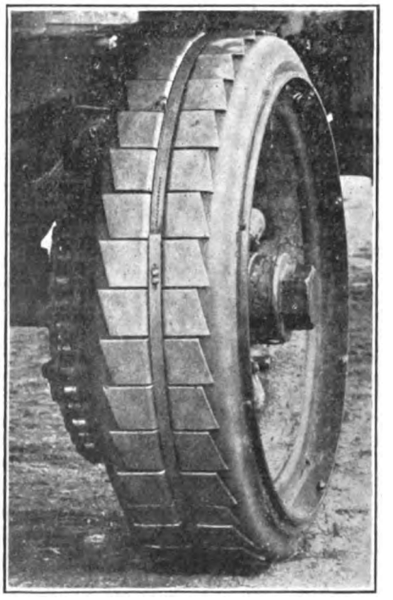
Voltmeters That Indicate Wrongly.

On electric cars using volt-ammeters considerable trouble sometimes arises from the fact that the heads of the indicating pointers of the meters not infrequently drop off, and the pointers, relieved of the weight, indicate figures that are too high, leading the owner of the car to believe that the motor is drawing a heavier current than really is the case, or that the voltage is abnormally high for some reason which he may not be able to figure out for himself. It is quite an easy matter to overlook the absence of the pointer head, and if the vehicle should happen to be stalled for lack of current when the voltmeter indicated that there should still be considerable current available, considerable trouble might be caused before the real difficulty was unearthed.

Tire Armor That Serves Two Purposes.

Despite the efforts of the tire manufacturers, one of the serious items of expense in the operation of a motor truck is the cost of tires, and one of the great problems of motor haulage is the reduction of this expenditure. Closely allied to the tire problem is the problem of traction on slippery road surfaces, and it not infrequently happens that the means adopted in endeavoring to solve the traction problem serve to hasten the destruction of the tires. Not satisfied with attacking either one of these questions separately, the Post Tire Armor Co., of Cleveland, Ohio, has set itself the task of overcoming both difficulties at once; the Post tire armor, which has been evolved for this purpose, is shown in the accompanying illustration.

While the Post device is by no means



POST TIRE ARMOR

the first tire protector that has been made with metal plates forming the wearing surface, it is claimed that the method of fastening the plates to the tire is original and that it is effective—which counts for a great deal more than mere originality. Each of the steel plates has a depression formed in the middle, and when asesmbled on the tire these form a continuous groove around the wheel between the twin tires. In this groove is wound a strip of spring steel some 30 feet long and wide enough to fill the channel snugly. The retaining band is thin enough to be very flexible radially, permitting the necessary relative movement of the plates as they come under the weight of the load, but is so wide that lateral motion is prevented and so strong that it is said to be more than equal to any strains that may come upon it. The continuous tread formed by the plates takes the road wear, reducing the wear on the rubber itself to that which is caused by the comparatively slight friction with the smooth steel plates; the loss on the plates themselves from road friction is given as approximately 1 cent per mile for most machines.

In the matter of traction the Post armor would seem to be decidedly effectice, the projecting edges and corners of the plates sinking into the ground and giving a good grip in any material that is capable of affording a hold.

DeDion Universal Joint Development.

For the lower powered De Dion-Bouton cars of the latest type, notably the eight, nine and twelve horsepower models the manufacturers have evolved a new style of universal joint which partakes of the functions of both a universal joint and an Oldham coupling. Though the principle on which it operates is not exactly new, the mechanism is worthy of more than passing note by reason of its inherent simplicity and ease of adjustment. It consists essentially of two grooved sliding members completely enclosed in a tight box-like housing, the grooved members serving as terminals for the ends of the shafts which are to be flexibly connected. By reason of the novel construction of the device, the shafts may be moved sufficiently, in any plane irrespective of each other, to preserve the bearings of either from damage. Not the least of its noteworthy features is that while it consists of the minimum number of working parts wear can be taken up very easily and at little expense by merely replacing the sliding members which form the bearings of the squared shaft ends.

The same DeDion lower powered models which are equipped with the new universal joint also feature a new clutch which is perhaps not quite as new as it might be inasmuch as it is but a modification of the familiar three-plate De Dion clutch which for years has been one of the distinguishing marks of this famous foreign brand of car. The new clutch is really the old clutch made over and refined, the principal difference between it and the clutch which still is used on the higher powered cars in the line being that the center disk is faced with leather. As the leather is put on in flat segments it is quite easy to renew. Another of the advantages claimed for it is that owing to the large contact surface comparatively light pressure between the plates is necessary. As is the case with the metal to metal clutches used in the larger cars, no lubricant is used.

Heat That Causes Carburetter Troubles.

Fuel supply pipes never should be run in proximity with the exhaust pipe or close to the muffler. Copper being a good conductor of heat, "gasolene steam" or "gas locks" are liable to be formed in the lead, which will cause the carburetter to be fed irregularly. If the installation of either the fuel pipe or the exhaust pipe cannot be changed it suffices to cover one or the other with asbestos.

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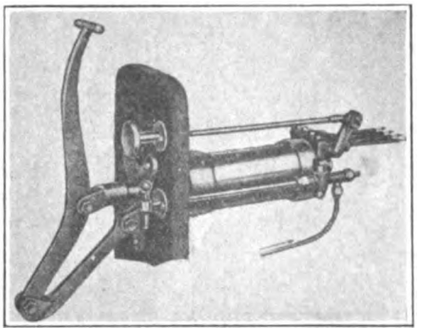
MOTOR STARTERS IN MANY STYLES

Special Model for Six-Cylinder Engines—Pumps Arranged for Operation by Hand or by Foot.

While most manufacturers are content to confine their energies to the production of a single type of device for giving the crank shaft of the engine its initial turns, the Auto Appliance Co., of Akron, Ohio, goes considerably further in that it provides a line of no less than four starters, in addition to a lamp lighter, a special priming and lamp regulating valve and a combined motor starter and lamp lighter. All the starters are of the acetylene type, but the details and the arrangement of the parts are worked out in various ways so that if the peculiarities of a car preclude the use of one model there is likely to be another that can be applied without trouble.

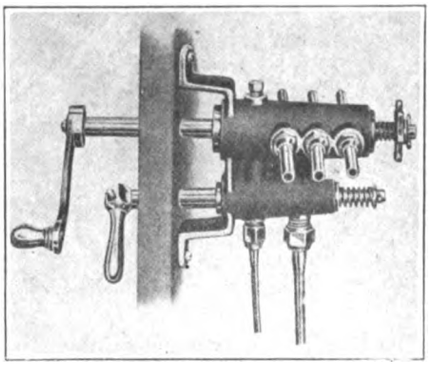
Model A is made with a gas-and-air pump mounted on the dashboard, under the hood, and operated by a handle on the driver's side of the dash, a set of valves mounted on the discharge end of the pump and the necessary piping from the acetylene tank and to the cylinders. To start the motor with the Model A outfit, the gas valve is turned on, the distributing valves opened by means of a handle on the dashboard and the pump handle pulled out and pushed in once for each cylinder of the motor. The valves then are closed and the gas turned off, when a touch of the button causes the spark that ignites the charges pumped into the cylinders. The gas pressure is regulated by a special regulating valve, the proportion of gas to air drawn into the pump thus being kept constant. A special type of Model A starter is provided, in which the pet-cocks on the motor can be used instead of the distributing valves on the pump, if the pet-cocks are suitably located. Model B differs from Model A only in the substitution of a spring-returned pedal for the handle for operating the pump. When not in use the pedal is held close to the dashboard by a hook. As in Model A, a special type is made for use in connection with the cylinder pet-cocks when this arrangement is possible.

Model C differs considerably from the other two, and, while not quite so simple, is so designed that it leaves the motor very little opportunity to refuse to start. It involves the use of a compressed air tank in addition to the gas tank; both are piped to a combined cut-off valve and mixing chamber mounted in the usual position on the dash under the hood. Just above the mixing chamber and cast integral with it is the distributing valve; both valves are operated by handles which project through the dashboard. The flow of gas and air is regulated by special regulating valves which operate automatically, the object being to ensure a proper mixture regardless of atmospheric or other conditions. To start the motor, the cut-off valve first is opened, permitting the gas and air to flow into the mixing chamber, when the turning of the distributing handle



"A-A" PUMP ENGINE STARTER

admits the mixture to the cylinders, after which the usual circuit-closing button switches on the igniting spark. A special construction of this model is provided for use with six-cylinder motors, which are somewhat addicted to stopping on dead centers. The distributing valve is arranged to be driven by chain and sprockets from a cam shaft. If the motor should fail to start because of its having stopped on dead center, pressure on a foot button opens a by-pass which allows compressed air to be distributed direct to the cylinders. No matter how the motor stops,



"A-A" DISTRIBUTER STARTER

there always will be a piston in such a position that the air pressure will cause a partial rotation of the shaft; and, as the cylinders already are charged with a good mixture, ignition and starting follow.

Model D handles acetylene gas only, injecting it into the cylinders, where it mixes with the air they already contain. The gas, under pressure governed by a regulating valve, as in the other starters of this make, is permitted to flow to the cylinders by pressure on a button on the dashboard, when pressure on the ignition button closes the ignition circuit.

In addition to these four models a "lighter-starter" is made, which consists of a pair of valves mounted together, with the usual dashboard control handles, one of which controls the flow of gas to the lamps and the other permits gas under pressure to enter the intake manifold of the motor, whence it finds its way to the cylinders. By keeping the starting valve open the motor may be run on acetylene as long as may be necessary; this feature is particularly desirable in cold weather, when it sometimes requires considerable warming up to induce a thoroughly chilled motor to run on its regular fuel.

The lamp lighter, which is made separately, consists of a needle valve mounted on the dash and controlled by a regular gas tank key, which is left open, acting only as a limit to the maximum flow of gas, and a second valve, which is used to shut off the supply to the lamps. The first quarter turn of the lighting handle closes an electric circuit which causes a spark at the gaps on the burners, and the remainder of the movement turns on the gas, the whole movement being half a turn. As the gas in the tank is used the regulating valve is opened to keep the maximum pressure at the lamp burners at the proper point.

For turning on the gas to the lamps from the front end of the car, and also for priming the motor with acetylene gas, a special valve is made which is designed to be attached to the frame of the car near the starting crank. A gas tank key is used to operate it.

Zinc Plate Might Save Radiators.

Outside of the reason commonly given for the use of nothing but pure water in the radiator—that is, the formation of scale—another and a very important reason exists. If two dissimilar plates are immersed in water in which a salt has been dissolved electrolysis is set up, which causes more or less rapid deterioration of at least one of the plates, the rapidity depending upon several factors, among which are the character and the quantity of salt dissolved, the material of the plates and the temperature of the liquid. The same thing happens with the radiator when care is not exercised to keep the water free from dissolved matter. The trouble could be entirely eliminated if all of the water used were distilled, but this, of course, is impractical. The method used on marine boilers for the elimination of the trouble is to suspend a zinc plate in the liquid, and it is not unlikely that the same treatment would also help on the motor car.

Hole That May Remedy Obstinate Leak.

When all other expedients to cure a leaky carburetter have been tried without avail, it sometimes suffices to drill a small hole in the cap over the check valve. This vent relieves the vacuum which is formed in the hole which serves as a plunger guide, which vacuum is formed by the plunger spindle when the valve is closing.

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ELIMINATING THE LOSS IN BATTERY CHARGING

The Wastefulness of Common Methods of Charging Vehicle Batteries and a Suggested Method Whereby Conservation of Current May Be Effected—Facts and Figures in One Engineer's Experience That Prove Almost a Revelation.

As simple as is the charging of vehicle batteries, provided the operation is performed under proper supervision of duly qualified persons, how much simpler it would be if it were possible to plug in every battery on the same line, and, after a predetermined period had elapsed, disconnect them all, fully and properly charged. Which, of course, is the ideal, and therefore the unattainable—at least, under present conditions.

Standardization of battery capacities would be a step in the right direction and would simplify matters considerably. Unfortunately, however, attempts at standardization show no positive results as yet, though the tendency toward this desirable end is well defined. In the meantime it is up to the individual charging station to work out its own salvation. Which means, in the majority of cases, that a number of batteries of different capacities must be charged with the least possible loss of efficiency. The problem is not an easy one and is augmented by the fact that even when two batteries of the same capacity are sent in for charging they seldom if ever are in the same state of discharge. It is well known, of course, that the rate of charge of a given battery depends, within certain limits, upon its capacity, and that the time of charge depends upon the state of discharge in which it is put on charge.

In drawing attention to these matters in a paper which he read before the monthly meeting of the Electrical Vehicle Association of America on Tuesday, 26th inst., J. F. Lincoln advocates the use of separate motor generator sets as the one real solution of the problem. Before formally launching into a description of the "Lincoln Multiple Voltage System," in connection with which his maintenance and efficiency figures are a revelation, Lincoln recounts some of the disadvantages of of other systems, both direct and alternating current, the latter being used with the aid of a mercury arc rectifier, and his conclusions are more than ordinarily pithy.

"One of the most usual methods of increasing efficiency," he says, "is to charge two or more batteries in series on the 125-volt system. This will certainly increase the efficiency, as it charges twice as many cars with the same power expenditure as would be the case if but one car was charged on the same circuit. The difficulty with this scheme, however, is the fact that it is almost impossible in actual practice to get two cars of equal size of battery and of equal state of discharge that can be put on at the same time. It naturally follows, then, that the garage operator will take any two cars that happen to come in at the same time and put them on in series. One of these two cars will have had a greater discharge than the other, and, therefore, this car should be charged at a higher rate than the one which has been discharged to a lesser degree.

"Of course, this is impossible, and the car which has had the greatest discharge generally decides the rate at which the new charge will be put in. This results in a very rapid charge for the car already partially charged and also does not give it the tapering charge at the end which is so important for mileage and life. These two difficulties are so pronounced that in every high-class garage at the present time series charging for lead batteries is not used, and it would not be done in any garage if the owner of the car knew how harmful such charging is as it usually is carried out.

"With the mercury arc rectifier, of course, it is necessary to charge cars in series, this series sometimes being as high as five cars on a line. This system is just that much more destructive than having two in series, since it is commercially impossible to get five cars which are sufficiently alike in their discharge that the charging rate on all five cars can be made the same without harm to one or more of them. The cost of tube breakage is likely to be excessive, partly on account of inexperienced labor and partly on account of the frail nature of the tube itself. There is also added to this the annoyance and possible expense of a shut-down, necessitated by the tube breakage.

"On account of the wide diversity of voltages required, it will be necessary for the ideal charging system to deliver a multiplicity of voltages, these voltages to be but very little higher than the maximum charging voltage for any given battery. In series with the battery there should be placed a small ohmic resistance which will automatically cause the charging rate to decrease as the charging goes on, consequent on the rising voltage of the battery. It will be necessary to have this rheostat so arranged that any rate can be given the battery from 5 to 60 amperes without danger to the rheostat. It would also be necessary for the best practical operation to be able to read at one or more central panels the state of charge and the rate of charge of each battery in the circuit. With an outfit such as this, the smallest possible amount of power would be wasted, thus giving the largest possible efficiency. There would be no necessity for many operators, since there would be no shifting of cars to be done, as all readings could be taken from a central panel."

Descriptive of the "Lincoln Multiple Voltage Systems," which are made in a variety of forms, Lincoln says: "They are, primarily, when the current supply is alternating, a motor generator set, the generator giving two voltages, one of them 105 and the other 70. Direct connected to this generator is a small double commutator booster whose fields are excited from the 105-volt generator, thus giving it a constant excitation, two windings on the armature being so arranged that when turning at the speed of the motor generator set they will deliver five volts. With this outfit it will be possible to add to or subtract from the voltage of the main generator this five volts. In this way, the voltages actually given will be 65, 70, 75 and 80, also 100, 105, 110 and 115. Another feature of importance is the fact that positive or negative boost from this small booster will be taken from opposite sides; that is, from one side in the case of the 105-volt commutator, and from the other side in the case of the 70-volt commutator, so that the size of the small booster can be made very small in comparison with the size of the main generator.

"The majority of cars in operation at the present time have the following batteries: 24, 26, 28, 30, 38, 40 and 42 cell lead, and 24, 40 and 60 cell Edison. Ninety-five per cent. of all cars in operation at the present time have one of these combinations of batteries in them. The only other ones in use are a few old type machines, which have 12, 14 and 16 cells. The number of these, however, is so small that they can be practically eliminated. The voltages necessary to charge the batteries named above are as follows:

24 cell lead,	62½	volts
26 cell lead,	67½	volts
28 cell lead,	72½	volts
30 cell lead,	78	volts
38 cell lead,	99	volts
40 cell lead,	104	volts
42 cell lead,	109	volts
40 cell Edison,	74	volts
60 cell Edison,	110	volts

"It will therefore be plain that with this

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charging outfit mentioned, all of the usual vehicle batteries now in operation can be charged direct from this multiple voltage system without a loss which will exceed a maximum of five volts, and which in actual practice will have an average of considerably less than two volts. This means a saving of from 2 to 50 per cent. over the single voltage system which is so often used. This also will allow all batteries to be charged in parallel, which is a very important feature. Another thing which is of especial importance is the fact that since there is a very small resistance in series with the battery, as the charge of the battery increases the charging rate will automatically taper off on account of the increasing of the battery voltage, thus giving automatically an ideal charge to the battery.

"Another feature is the consideration that on account of the very small loss in the rheostat, the size and cost of the charging rheostats can be made very small—very much smaller and cheaper than is possible to make a rheostat which must take care of voltage drops of from 40 to 50 volts, which would be absolutely necessary in the case of the single voltage system.

"Considering the relative cost of installation of the single voltage system and of the multiple voltage system comparatively, the kilowatt capacity of the multiple system to do a certain amount of charging is a great deal less than the kilowatt capacity necessary on a single voltage system. The reason for this is plain, since on a multiple voltage system practically all of the power generated is used as useful charging current and put into the battery, while in the case of the single voltage system a great part of the power generated is dissipated in heat in the charging rheostats. As an example of this we cite the following:

"The kilowatt capacity necessary to charge 10 24-cell and 10 40-cell cars at one time at their full ampere rate is, on the 'Lincoln Double Voltage System,' 26 kilowatts, while on the single voltage system the power necessary would be approximately 40 kilowatts, which, in other words, means that the 14 kilowatts out of this 40 kilowatts is dissipated in heat in the rheostats, while but 26 kilowatts is used in useful charging current. If in this example we had used a larger percentage of low voltage cars the difference would have been even greater in favor of the multiple voltage system; or, taking a concrete example, if two or the cars are 40-cell and 18 of them 24-cell, the capacity to charge them on the multiple voltage system is 26 kilowatts, while on the single voltage system it would be 50 kilowatts, meaning that 24 kilowatts out of the 50 kilowatts generated would be dissipated in heat in the charging rheostats. Another feature which reduces the cost in the multiple voltage system is the fact that since there is but a very small amount of heat to be dissipated in the charging rheostat, therefore this rheostat can be very small and have a much lower cost than if a larger amount of power was dissipated.

"The cost of charging in the usual garage is a very large item in the actual cost of operation. It is evident ,therefore, why it is that a great many garages insist that it is impossible to make an electric garage a paying proposition. It might be well to take an example of a certain garage to show just what the power and installation saving would be. It is already seen that the first cost of installation, on account of the smaller kilowatts capacity necessary, would be less than the single voltage system. Now let us consider what the cost of operation would be.

"There is a garage in one of the largest Western cities which has the following cars which are charged every night:

55—28 cell
22—24 cell
6—40 cell
18—24 cell
3—40 cell

"The capacity necessary to charge these batteries at their full rate, providing they are all put on at one time, would be, with the single voltage system, 260 kilowatts, and the cost of putting in a charge, providing the batteries of all these cars were exhausted, would be at a rate of 3 cents per kilowatt hour, approximately $58. The capacity necessary with the double voltage system will be 153 kilowatts, and the cost of putting a charge into these cars with the 'Lincoln Multiple Voltage System' would be $34. The cost of installation of these two systems would be as follows, including distributing panels, rheostats, wiring, etc.. 'Lincoln Double Voltage System' would be approximately $6,500, while on the single voltage system the cost would be $9,000, so that the operator would not only save 30 per cent. on his first investment, but he would also save approximately 40 per cent. in his total charging cost.

"At the same time he would be able to handle his garage with less help and would be able to take readings and taper his charges with less than half the attention which would be necessary with the single voltage system.

"If the supply current is direct instead of alternating, the problem is changed to a great extent. Almost all direct-current supply, if from the central station, is three-wire, giving 115 and 230 volts. The usual method of charging from this system is to either charge three cars in series on 230 volts, with the resulting harm of series charging, or to charge all cars in parallel at 115 volts, which means a large loss of power in the charging rheostat. It therefore becomes plain that there is a considerable chance not only for more efficient charging, but also for more efficient charging by getting the actual voltage which will be necessary for each particular battery. It is more easily taken care of, however, than it would be if the supply were alternating. The best possible scheme to do this would be to put in a three-machine balancer, cutting up the voltage into the following voltages: 75, 80 and 80. Then direct-connect to this the booster, so that the positive and negative boost can be given to any circuit. In this way it will be possible to get the following voltages: 60, 65, 70, 75 and 80. The 115-volt current can be gotten directly from the circuit from the neutral outside supply line. In this way extremely efficient working can be had, and also parallel charging. This means, in the usual garage, a saving of from 20 to 30 per cent. over the method which is usually used for this work and you also have the advantage of having a small and cheap rheostat and the added advantage that the battery will automatically taper its charge.

"In the case of the single car charging in the private garage, there are at the present time a great many rectifiers used for this work. The reason for the use of these rectifiers, as a general thing, is the fact of their very high electrical efficiency. There is not the slightest doubt that they are, electrically, a great deal more efficient than a motor generator set. In some cases this will be as much as 15 per cent. However, the cost of tubes for the usual private garage is so high that the small difference in electrical efficiency is more than over-balanced by the necessity for changing of tubes and by the inconvenience of shut-down. Another thing is that the rectifier can never be relied on to cut off at the proper time, unless the line voltage happens to be constant, which it never is in the usual outlying district when supplied with central station power. The cost of replacement of a 50-ampere tube is approximately $30. This includes the expressage on the tube and the electrician's time in replacing it. This is guaranteed by the company to last 600 hours, therefore the cost of operation per hour of the tube is 5 cents. The total power going through the tube on the usual lead battery is two kilowatts, which, at a 5-cent rate, costs 10 cents, or, with the addition of the 5-cent depreciation of the tube, the net cost of charging is approximately 15 cents per hour.

"The cost of the motor generator set to deliver the same amount of power would be 12 cents for this, taking into consideration also a difference of 20 per cent. in electrical efficiency, which is considerably more than the actual difference in electrical efficiency. The usual owner of a passenger or pleasure car is not nearly as much interested in a possible saving of a few cents one way or other as he is in the ability of the car to keep in operation. The occasional shut-down owing to the breaking of a tube means the loss of one or more days' use to him, which costs him considerably more than the few pennies' difference in the cost of charging."

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RUSHMORE URGES SINGLE WIRE

Points Out Advantages of Grounded Return Circuit—Saving in Copper and Complication—Warship Examples.

"The brief note, 'Where Two Wires Are Not Necessary,' which appears in the last issue of the Motor World, touches altogether too lightly on what seems to us a most important subject," writes S. W. Rushmore, of the Rushmore Dynamo Co.

"Most people with but limited experience in electrical matters have the idea that gound connections must be avoided under all circumstances and are ignorant of the fact that the leading electrical engineers now recommend the grounding of even the highest voltage power transmission and lighting systems and that for the protection of life and property the neutral wire of all the great three-wire city underground systems is grounded.

"Most automobile engineers have to date insisted upon wiring their cars for electric lights on the insulated two-wire system, although we have argued that the grounded system is to be preferred on every point.

"1. It is ten times easier to insulate a single central conductor from ground alone than it is to insulate two wires in the same cable sheath from each other and from ground.

"2. With the large low volt lamps now used in headlights the voltage drop in the wiring is of great importance. If we use the same size wire and connect to the heavy car frame for return we save one-half the copper and at the same time cut the voltage loss in half.

"3. If we combine the two separate wires into a single central conductor we may still have better insulation with the same cable diameter, and, with the same investment in copper, cut the voltage loss to but one-fourth that with the same copper on the two wire-system.

"4. It is generally conceded that the lamp base diameter that has been adopted for automobile service is altogether too small for the heavy currents employed since the perfection of the automobile lighting dynamo. It is too late to adopt a new base, but by using the rational single wire system there will be ample space for the heavy contacts demanded.

"We have for years made a specialty of electrical equipment for steam vessels and have installed our electric searchlights and also complete electrical plants on thousands of American and foreign-built ships. On all foreign ships, which constitute some 99 per cent. of all seagoing steamers, the one-wire system with ground return is used for all lighting and motor service and the foreign engineers argue, with perfect logic, that that system is not only safer, but, with thousands of tons of steel in the hull and frame of the ship, it is utter folly to use four times the amount of copper for the same service.

"On American-built ships the two-wire idea prevails, yet nine times out of ten it will be found that there is a ground on one side of the system. It is only human nature to leave well enough alone, and marine engineers almost never pay any attention to a ground until a second ground comes on. Then, frequently if the second ground is the heavier, the first ground will be "blown" off and things continue peacefully, with the ground detector showing on the other side.

"As a matter of fact, nearly all of the American ships are running on the one-wire grounded system, only the extra copper is a dead loss, and for the same investment in copper only one-fourth the maximum electrical efficiency is realized.

"In wiring an automobile one encounters on a small scale all the difficulties of wiring a steel ship, and the fact that the great 'Olympic,' together with practically every oceangoing steamer, is wired on the grounded one-wire system, should not be overlooked.

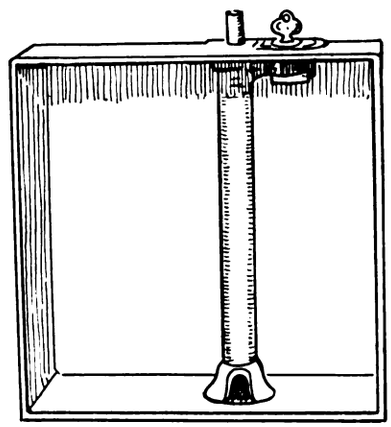
"There can be no question that the magneto must soon give way to the auto-sparker, taking current from the large car lighting battery, and an insulated, or 'groundless' ignition system would be regarded by most engineers as an absurdity.

"The point-to-point contact lamp base and socket now in use has been found totally inadequate and liable to frequent short-circuit. With the single wire system it will be very easy to employ connectors of simple male and female spring contact type of high current capacity.

"Several large car manufacturers have already adopted the grounded one wire system, and the leading tungsten lamp makers now supply the lamps in all candlepowers, with the base rim forming one terminal and with a single insulated central contact, and report the cost of manufacture to be lower than with the two-contcat type."

Locking the Gasolene to Prevent Theft.

While there are many possible ways of locking up a motor car that is left standing unattended, either in the garage or in the streets, there is no way that seems to appeal so strongly to common sense as that which will positively prevent the operation of the motor under its own power. This prevention of theft or the unauthorized use of a car is aimed at by the Ideal Auto Lock Co., of Detroit, Mich., in bringing out its device, the Ideal lock, which consists essentially of a gasolene shut-off valve which, when closed, is securely held in that position by a snap lock.



IDEAL GASOLENE TANK LOCK

The whole of the mechanism used, which is simple and not liable to get out of order, is installed in the tank, only the top of the lock and the push-rod by means of which the valve is closed being visible above the upper sheet of the tank. As the fuel is shut off at the bottom of the tank there is none in the pipes or in the curburetter when the car is left standing if the motor is allowed to run until it stops after the tank has been locked. To lock the tank it is only necessary to push down the locking rod; the key is required only for unlocking. No two keys are alike. The maker claims that the Ideal lock will fit any car and that it is not possible to force it with any tool.

Instrument That Answers Old Question.

When men first began to wonder how much more gasolene there was left in the tank, they satisfied their curiosity by poking a stick through the filling hole and noting how much of the stick was wet when it was withdrawn. There is no telling how much trouble has been caused by dirt and splinters from this primitive measuring instrument, to say nothing of the fact that it was a makeshift of the most pronounced type. A measuring instrument that is a development of and an improvement on the old stick idea has been brought out by the Jeannette Auto & Machine Co., of 12 South Second street, Jeannette, Pa. It consists of two guide pieces with a cork float between them. Pressing the guides toward each other at the top permits the cork to slide freely between the guides, and releasing nips the cork and holds it fast. To measure the gasolene, the "Safety gasolene rule," as the makers call it, is pinched at the top, inserted in the tank until it touches bottom, and the pressure released. The cork of course floats to the top of the gasolene and is held at that point while the rule is withdrawn. The total length of the instrument is 14 inches, of which 12 inches is marked off for indicating purposes.

While the instrument is marked off in inches, it is easy to arrange it so that it will read also in gallons by taking a series of readings with known quantities of gasolene in the tank and marking the scale accordingly.

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HERE'S A SUBSTITUTE FOR WOOD

It is Composed of Inorganic Substances and is Styled "Asbestos Wood"—Its Properties Explained.

Professor Charles L. Norton, who is a member of the American Society of Mechanical Engineers and is of the faculty of the Massachusetts Institute of Technology, has perfected a substitute for wood the characteristics of which not a little suggest the possiblity of its application to the manufacture of automobile bodies and other parts which, in a great many cases, still are made of natural wood. The new material is described as "a refractory substitute for wood" by Professor Norton, the same designation serving also as the title of a paper which he read before the last meeting of the American Society of Mechanical Engineers and in which he fully described his product, which is claimed to be "practically incombustible, harder than natural woods, to have a transverse strength about two-thirds that of white pine with the grain, and, without being brittle, an elasticity less than that of natural woods."

In leading up to what he proceeds to describe as "asbestos wood," the material being made under his patents and developed from the application to certain mixtures of certain processes of mixing, pressing and curing, Professor Norton mentions first some of the earlier processes of fireproofing and waterproofing natural woods by way of pointing out the superiority of his new material over older methods and manufactures. Though the substances he describes in brief, and the processes, are more or less well known, his conclusions with regard to them are interesting, inasmuch as they tend to make plain the trend in the direction of obtaining a satisfactory substitute for wood for general use.

"Many of the earlier attempts," he said, "were made in the direction of altering the natural wood by some chemical treatment, so as to make it ignite with greater difficulty and burn more slowly and without much flame. These processes afforded a number of so-called fireproof woods. The principle underlying the treatment was usually one of two: First, the wood was saturated with a solution which, on drying, left in the pores a salt capable of giving off a gas when heated, this gas being of such a nature as to be incapable of supporting combustion. Phosphate of soda and tungstate of soda were used extensively for this purpose. With thorough saturation the protection afforded the wood and adjoining portions of the structure was by no means insignificant; specimens of wood treated with phosphate of soda have been in my possession for more than 10 years, and after 10 yearly tests show no signs of deterioration. Similarly, some specimens of wood and cloth treated with tungstate of soda in 1903 have shown little or no loss in fire resistance. The main value of such chemical protection lies in its diminishing the volume of the resulting flames. When once thoroughly ignited, the fireproof wood burns more briskly than the natural untreated wood.

"The second method of chemical treatment was one in which such substances as alum were used in order to supply a considerable quantity of steam from the water of crystallization and also to encase the pores of cells with solid refractory substance. A still earlier procedure was that of protecting wood from contact with a combustion supporting atmosphere by coating it with thin sheet metal, usually tinned iron or copper. For doors and shutters this was found very effective. More recently hollow metallic members for doors and trim and for furniture have been extensively used with a considerable degree of success. They are, of course, non-combustible, and under ordinary exposure keep their shape fairly well.

"There must have been from time to time in the last 30 years attempts to make use of boards composed only of refractory, inorganic substances. In general, such boards have been composed of some fiber and a cementing medium. The most popular fibers for this sort of experimentation have been asbestos and mineral wool, the cements used including about all the common cements of both the air-drying and the hydraulic types. Oxychloride of magnesium, the value of which as a cement was discovered some 50 years ago by Sorel, has been the favorite cement for experimenters because of its simple preparation, its quick hardening and great strength. For some reason, however, a large percentage of the oxychloride cement is variable in its properties and often defective. When mixed with sand or similar dense bodies, the oxychloride often is satisfactory for long periods, but my experience with mixtures of this cement with fibers, both organic and inorganic, leads to the conclusion that it is unstable and unsatisfactory.

"After much further study, two conclusions seemed inevitable: First, no homogenous inorganic substances are likely to prove satisfactory, but that a mixture of a fiber and a cementing substance is necessary to give wood characteristics to the material; and, secondly, a mixture of asbestos fibers with one or two cements (first, oxide of magnesium or calcined magnesia, and, second, calcium silicate and aluminate mixture) seemed more suitable than any other combination."

In describing his "asbestos wood" Professor Norton states that the "weight of the several grades per square foot, one inch thick, varies from 8 to 13 pounds." Inasmuch as perfectly dry white pine of the same thickness weighs approximately three pounds per square foot, and oak weighs nearly twice as much, it may be appreciated that there is considerable difference in weight. The other characteristics, however, offset this disadvantage.

"The transverse strength of 'asbestos wood' boards and the maximum stress is between the limits of 5,000 pounds and 10,000 pounds," he continued. "Test specimens 12 inches wide, 12 inches long and ¼ inch thick, broken by center load when supported on two edges with 11-inch span, broke, on an average, at 200 pounds load. Under the same conditions clear white pine broke under a load of 300 pounds with grain and 20 pounds across it. In some cases the equality of strength in both directions is of great advantage.

"The tendency of the material to absorb water varies between the limits of 4 per cent. and 20 per cent. This absorption is not of such a nature as to cause disintegration from freezing and the material is not injured by prolonged soaking in fresh water. Sea water tends to disintegrate it after a time, the magnesium salts in the water replacing the calcium of the cement. The coefficient of expansion varies with the temperature and also with the age of the specimen. It is small, being about 0.000004 at ordinary temperatures, diminishing rapidly at 700 degrees Fahrenheit, and becoming negative at 90 degrees Fahrenheit, where shrinkage occurs. The operations of boring, sawing and finishing are all somewhat more difficult with 'asbestos wood' than with the natural woods. It withstands scraping and rubbing much better.

"It is, of course, the fire resistance of the 'asbestos wood' which gives it its greatest interest. There is nothing combustible in it, and on exposure to fire nothing can occur except a gradual dehydration of both fiber and cement. Under prolonged red heat the boards become weakened, but for such exposure as occurs in fires in buildings the resistance is ample. For instance, a sheet of ¼-inch 'asbestos wood' may be placed over the top of an open furnace at 1,700 degrees Fahrenheit, the flame impinging directly on the lower surface of the sheet, and at the end of half an hour the sheet may be taken off and, while its lower side is still white hot, be plunged into cold water and then returned to the furnace for 10 minutes. It may be slightly warped and its strength probably will be diminished 25 per cent. or more, but it will still be sound and whole, and free from cracks or serious weakness. Fire tests have shown the ability of the material to withstand much longer exposure, but it is not suitable for linings for furnaces or kilns which are kept constantly at red heat. In some fire tests the paint on the outside of an 'asbestos wood' door 1¼ inches thick was not scorched after the fire inside had been burning at a temperature of 1,700 degrees Fahrenheit for more than an hour."

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1,003,728. Detachable Rim Device for Road Vehicles. Alexander Flett, London, England. Filed Apr. 26, 1910. Serial No. 557,768.

1. A detachable rim device, comprising a tire-carrying rim, a fixed flange secured upon the wheel, a loose flange, seatings for said rim upon said flanges, said seatings acting to center said rim between said flanges, a bayonet-joint between said flanges, said bayonet-joint including slots having inner portions oblique to the plane of the wheel, a curved rack secured upon said loose flange, a pinion adapted to engage said rack, said pinion journaled at a fixed point of the wheel, means for rotating said pinion, means for locking said loose flange at any one of a plurality of positions, said locking means comprising a plate having teeth upon opposite edges and arranged in different pitch-relation and a cover adapted to inclose said rack and locking means, said locking means being attached to said cover.

1.003,743. Means for Starting Internal Combustion Engines. Gottlob Honold, Stuttgart, Germany. Filed Mar. 21, 1908. Serial No. 422,418.

1. In an ignition system for multicylinder engines, the combination, with a plurality of igniters, and a source of electrical energy arranged to supply current to the igniters, of a positively actuated circuit interrupter arranged to interrupt the supply of current to the igniters, a normally inoperative trembler circuit breaker and manually controlled means for rendering the trembler operative.

1,003,740. Spark Plug. Otto H. H. Heins, Edgewater, N. J. Filed June 16, 1909. Serial No. 502,491.

1. An igniter comprising a chambered tubular spark plug having an open and a closed end, a pole piece extending through the closed end and suitably insulated therefram, said pole piece bearing a terminal electrode in spark-producing relationship to said open end, and a blocking-out body of heat-resistant insulating material mounted on the pole piece behind said electrode and spaced away both from the side walls and the rear wall of the chamber within the plug, said blocking-out body being recessed on one or more end faces.

1,003,750. Starting Device for Gas Engines. Charles Francis Jenkins, Washington, D. C. Filed July 25, 1910. Serial No. 573,821.

1. In an internal combustion engine, the combination with a series of explosion cylinders and igniting devices for the same, of a non-explosion cylinder and a plunger therein, means for temporarily rendering the ignition device for one of the explosion cylinders inoperative, thereby converting the cylinder and its piston into a force pump, a conduit leading from the last named cylinder to the non-explosion cylinder to actuate its plunger, and means whereby said plunger when thus actuated may restore the inoperative ignition device to operating condition.

1,003,567. Automobile Power Motor. Clifford A. Woods, Plankinton, S. D. Filed Nov. 27, 1909. Serial No. 530,248.

1. An automobile power motor comprising a platform having inclined approaches to permit the conveyance of the automobile thereon, friction drums rotatably carried by the platform and projecting thereabove, rotatable means operatively connected with the drums for transmitting power, and an adjustable brace adapted for engagement with the drive axle of the automobile to position the drive wheels in engagement with the drums, said brace comprising a slotted rod carried by the platform, a pair of divergent arms slidably engaged with the slot and adjustably secured together at their upper ends and a clamp carried by one of the arms for engagement with the axle.

1.003,579. Pneumatic Cushion for Vehicles. George J. Bancroft, Denver, Colo. Filed June 7, 1910. Serial No. 565,619.

1. The combination with the axle of a vehicle and a spring thereof having a member extending below the axle, of a cushion composed of a lower frustum-shaped member having an exteriorly-projecting horizontally disposed part, an upper co-operating inverted dish-shaped member, and means connected with the lower spring member, passing through the frustum-shaped member of the device and forming a support for the inverted dish-shaped member, the latter being free to vibrate vertically with the spring and supporting means, and an endless pneumatic tube interposed between the inverted dish-shaped member and the frustum-shaped member of the device, substantially as described.

1,003,620. Combined Muffler and Air Heater. Edward Dudley Lewis, Elmira, N. Y. Filed Aur. 18, 1910. Serial No. 556,264.

1. A heater comprising an outer casing having an inlet at one end and an outlet at the other end, intercommunicating hollow sections arranged transversely of the said casing and having flanger edges in contact therewith, said flanges having openings out of alignment with each other, thereby forming a tortuous air passage: the end hollow sections being provided with an inlet and an outlet respectively for the heating medium.

1,003,619. Spring Wheel. Harry Laubersheimer, New York, N. Y. Filed Nov. 1, 1910. Serial No. 590,127.

1. A spring wheel including a yieldable tread constructed of separable sections, each of the said sections being formed at one end thereof with an undercut recess and at the opposite end thereof with an extension terminating in an enlarged head, the extension of each of the sections fitted within the recess of an adjacent section, and both the extension and the recess extending entirely from the top to the bottom of the tread section and having a uniform cross section so that the extension will slide within the recess in a radial direction with respect to the wheel.

1,003,621. Brake. Charles L. Lincoln, Bridgeport, Conn., assignor of one-half to Samuel H. Wheeler, Bridgeport, Conn. Filed Dec. 28, 1910. Serial No. 599,741.

1. In a brake of the class described, the combination with a drum, and a fixed support, of a brake band to encircle the drum, a stud carried by one end of the band, a bolt adjustably mounted in the stud, a link one end of which is pivotally mounted upon the support and the other end pivotally connected to the free end of the bolt, an operating lever one end of which is pivotally connected to the other end of the branke band and its intermediate portion pivotally connected to the ends of both the before mentioned bolt and link, and an operating rod pivotally connected to the other end of the said lever.

1,003,625. Odometer. Kendree Littlejohn, Pacolet, S. C. Filed May 23, 1911. Serial No. 629,034.

1. An odometer comprising an annular housing adapted to embrace the wheel hub, a registering device within the same and an actuating device for the register consisting of a circularly curved lever having a fulcrum within the annular housing and on one side of the center of the same, and an attached weight on the opposite side of said annular housing with respect to the center of the wheel hub, and means connecting said curved lever to the register.

1,003,768. Automobile. Henry Mayer, St. Louis, Mo., assignor of one-half to Frederick Mayer, St. Louis, Mo. Filed May 31, 1910. Serial No. 564,259.

1. The combination with the spark circuit of a self-propelled vehicle, of a steering-post provided with a recess or opening adapted to form part of said circuit, a steering wheel loosely mounted on said post, and a metallic locking member movably arranged on said wheel adapted to removably engage with said recess or opening to releasably hoid said wheel in operative engagement with said post, the graund wire of said circuit being electrically connected to said locking member and said circuit being completed or grounded through said post when said locking member is in engagement with said recess or opening, substantially as described.

1,003,795. Internal Combustion Engine. William Rabsilber, Brooklyn, N. Y. Filed June 21, 1909. Serial No. 503,294.

1. A system of fuel supply for internal combustion engines, consisting of the combination with a motor; of a reservoir for liquid fuel; a pressure tank in which is contained liquid fuel under pressure and at practically ordinary temperature; a heating coil connected with said motor and tank; means for heating said coil by the exhaust gases from said motor; mechanism for drawing liquid fuel from said reservoir and supplying it under pressure to said heating coil and pressure tank; means controlling the pressure at which the liquid fuel is supplied to said heating coil and pressure tank; and a valve-controlled conduit connecting said pressure tank and reservoir.

1,003,800. Rotary Explosion Engine. Pantaleon Michailowitsch Rodigin, Berdiansk, Russia. Filed June 22, 1910. Serial No. 568,415.

1. In a rotory explosion engine, the combination of an annular cylindrical casing, a shaft passing centrally therethrough, a disk keyed to said shaft, a plurality of pistons carried by said disk and adapted to rotate in said casing, a disk loosely mounted on said shaft and provided with a plurality of pistons also adapted to rotate in said cylindrical casing, a spring connecting said second named disk to said shaft, and spring-pressed abutments preventing the backward motion of said loose disk, substantially as described.

1,003,815. Protector for Vehicle Tires. Charles Scott, Baker, Ore. Filed May 10, 1911. Serial No. 626,324.

1. In a tire protector the combination

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with a wheel and a tire therefor, of rings encircling the rim of the wheel adjacent each side thereof, an endless cable passing alternately around said rings and over the tread of the tire, clamping rings co-operating with the first mentioned rings, to prevent slipping of said cable, and means for preventing displacement of said clamping rings.

1,003,861. Starting Device. Lucian Hewitt Appelman, Clermont, Iowa. Filed Feb. 25, 1911. Serial No. 610,919.

1. In a starting device, the combination, with a mixing cylinder provided with means for securing it to the intake pipe of an engine and having also an air inlet valve and a laterally projecting tubular branch, of a fuel cylinder connected to the said branch and provided at one end with a tube which projects crosswise of the said branch and having also a valve for closing the said tube, and means for heating the other end portion of the fuel cylinder.

1,003,867 Door Signal. Leon Lipman Bories, San Francisco, Cal. Filed Nov. 7, 1910. Serial No. 590,991.

1. In combination with a door, an indicator mechanism, a door-actuated mechanism in the frame of the door, consisting of a tube having a longitudinal slot in the side thereof, a spring-pressed rod within the tube and having a finger projecting through said slot and a projecting end engaged by the door in closing, and an actuating wire leading from said finger to the indicator mechanism, whereby when the door is closed, the indicator mechanism will be actuated.

1,003,909. Internal Combustion Engine for Air Compression Purposes. Fred Edward Jackson, Williamstown, Victoria, Australia. Filed Nev. 21, 1910. Serial No. 593,498.

1. The combination, with a four-cycle, multi-cylinder internal combustion engine and a pipe common to the cylinders, for supplying the engine with gaseous fuel, of valve means interposed at a selected point in said pipe, and operable to cut off the communication of said pipe with a selected one of said cylinders and at the same time to establish atmospheric communication with the cylinder thus cut off from said pipe, and an air receiver adapted to be fitted to the cylinder thus cut off from said pipe and having a non-return valve.



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MILLSTONES.

This is particularly true in respect to the purchase of automobiles and many hundreds of people annually suffer the consequences of ill-advised purchases from firms that engage in re-selling cars that never should have been on the market. The moral is

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SALESMAN—One who is now visiting automobile trade in general, to take side line. Liberal arrangements made. Attractive proposition. BOX 200, care Motor World.

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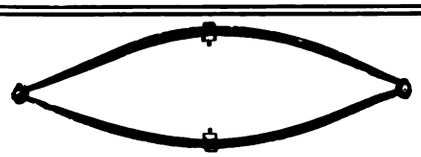
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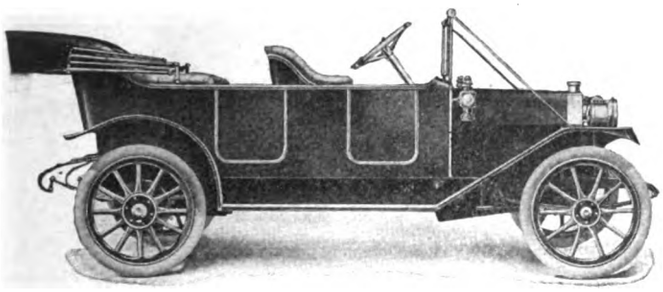
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Price $850

Announcing

The Big Brother of the Famous Empire Runabout

The Empire 25 offers an astonishing and hitherto undreamed of value to those demanding a small car up to the standards of the biggest and highest priced automobiles.

This announces the new 1912 model of the Empire 25—probably the most splendid little car that has ever graced the American Automobile Market.

The Empire 25 has been aptly termed "The Little Aristocrat."

The Empire 25 is aristocratic in its clean cut, gracefully symmetrical and high grade design; aristocratic in its marvelous workmanship and finish; and it is "aristocratic" in its **performance,** which at once marks the Empire as the greatest masterpiece in small car construction.

Aside from superfluous power and excessive size, the Empire is in every other respect a miniature of the highest grade autos built. Such a **quality** at such a **price** has never been approached—**much less duplicated.**

A graceful car with body design following the general lines of cars costing seven times as much—the result of a prize competition entered by best known body experts in the country.

All doors **extra large,** to facilitate getting in and out, either side.

Big swell steering wheel—big artillery wheels with large hubs—big tires—a big 104-inch wheel base.

Following high grade car construction, the dash and cowl are of aluminum; the clutch is of 9-inch plates instead of 5, the kind commonly used in cars at this price, and the transmission is the same as used on cars up to 40 H. P.

Equipped with **High Tension Magneto,** the engine starts with half a turn.

Front axle and steering knuckles extra heavy; the idea of maximum strength, safety and reliability prevailing throughout, as in the construction of no other car at the price.

You can at once see that the Empire 25 sets a new standard for small-car value and at the same time introduces an **economy** of vast significance to an army of prospective automobile buyers.

SPECIFICATIONS OF THE EMPIRE 25

Motor—25 H. P., 3½-inch bore, 4½-inch stroke—cylinders cast in pairs.

Cooling System—Large radiator in conjunction with a belt-driven fan. Circulation effected by the thermo-syphon method.

Valves — Fully enclosed, adjustable for wear.

Lubrication—Constant level, force feed.

Ignition—High tension magneto, set spark.

Clutch—Disc clutch, dry plate type, Raybestos faced.

Control — Single lever, center control. Throttle lever above steering wheel. Clutch, service and emergency brakes operated by foot pedals.

Steering—Full worm and gear type.

Brakes—Two external, contracting. Two internal, expanding on rear wheels.

Transmission—Three speeds forward and reverse, selective type, mounted on annular bearings. Unit power plant.

Gears—That are silent even when shifting.

Rear Axle—Semi-floating type.

Front Axle—I-beam section, drop forged. The size of the steeirng knuckles would do credit to a car twice the weight of the Empire.

Springs—Three-quarter elliptic rear, semi-elliptic front.

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Wheel Base—104 inches.

Body—Aluminoid steel, wood trimmed; fore-door, full vestibule, straight lines from front to rear, ample room in tonneau, seats wide and deep, buffed leather cushions comfortably slanted, inside handles on doors.

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OF

THE BICYCLING WORLD (FOUNDED 1877) and MOTOR CYCLE REVIEW

(April 27, 1912)

will contain information that will make it

A Complete Handbook of the Industry

Among the Leading Features Will Be:

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2—A halftone of the president and sales manager of every American firm making motorcycles or bicycles.

3—A brief story of the condition and plans of the really live clubs.

4—Cycling track records up to date, conveniently arranged for reference.

S—Several pages of historical matter covering the story of the "two wheeler" from the beginning.

6—A digest of all State laws governing motorcycles.

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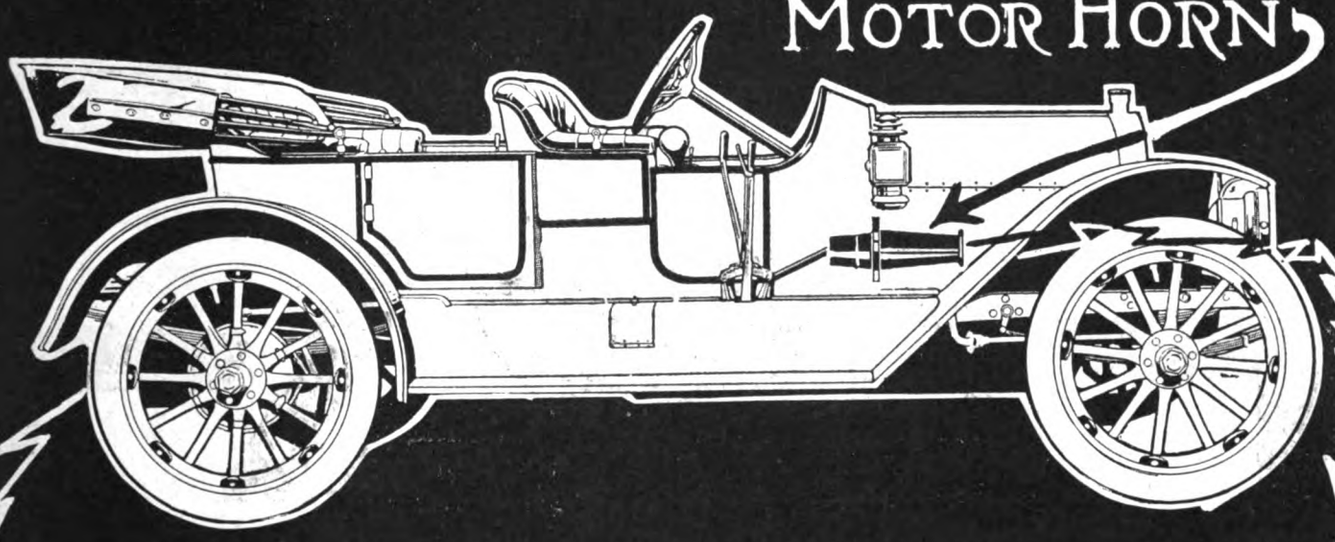
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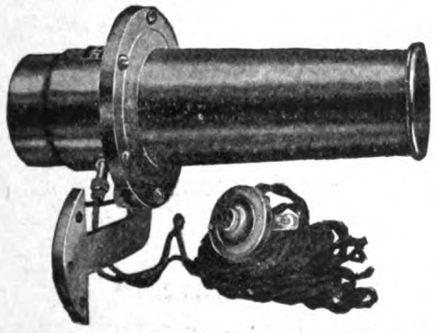
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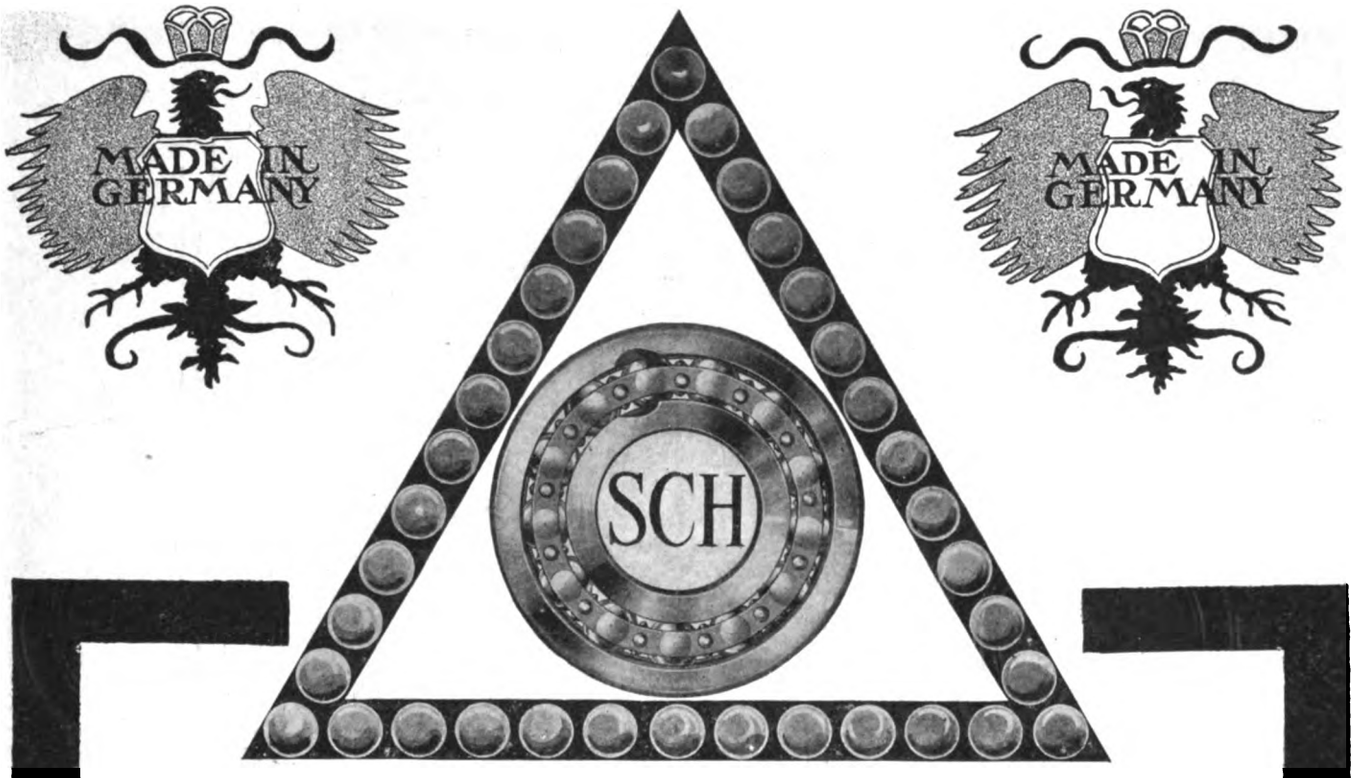
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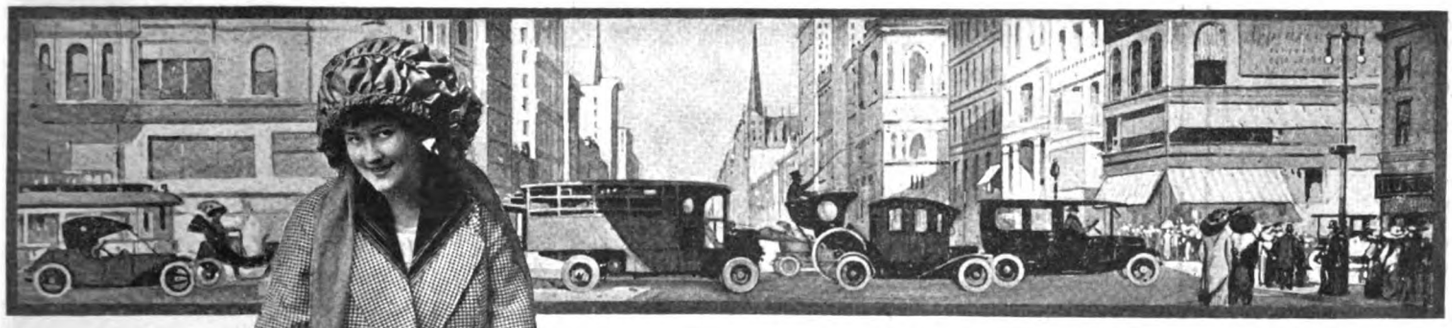
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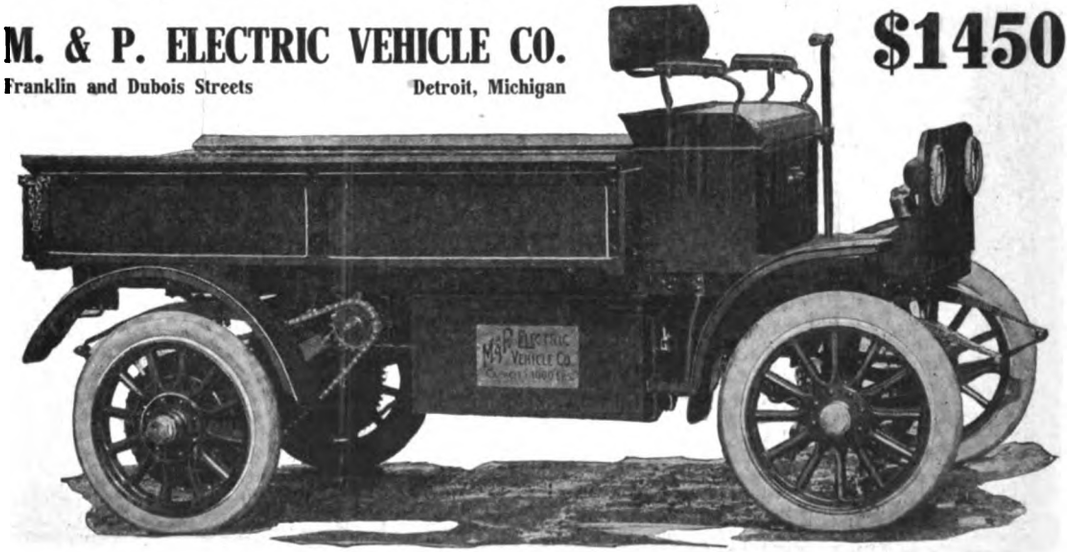
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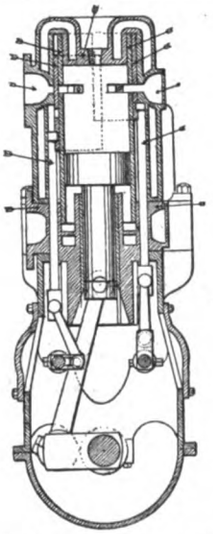
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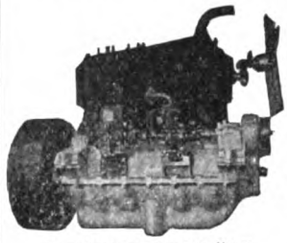
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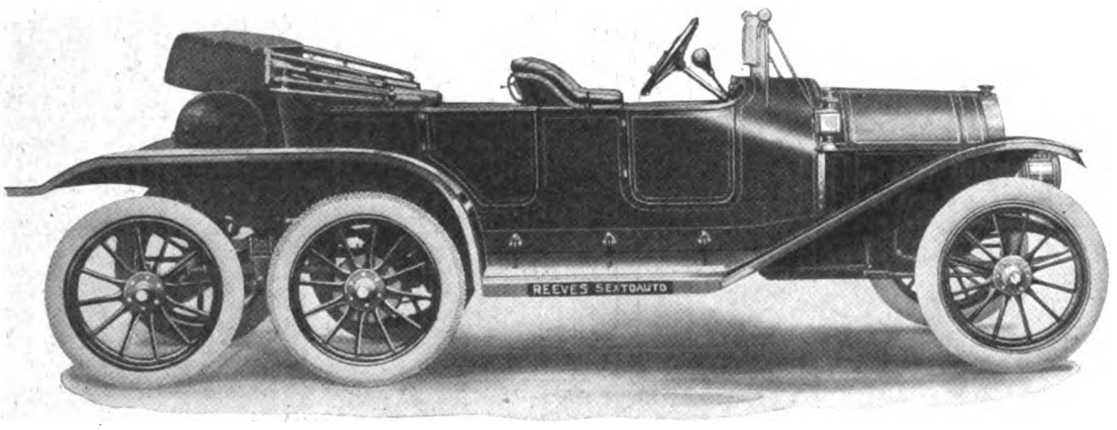
All Reputable Dealers



WEED CHAIN TIRE GRIP CO.
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The Octoauto's Sister

NO SHOCK
NO JOLT

Rides Like a Pullman Palace Car

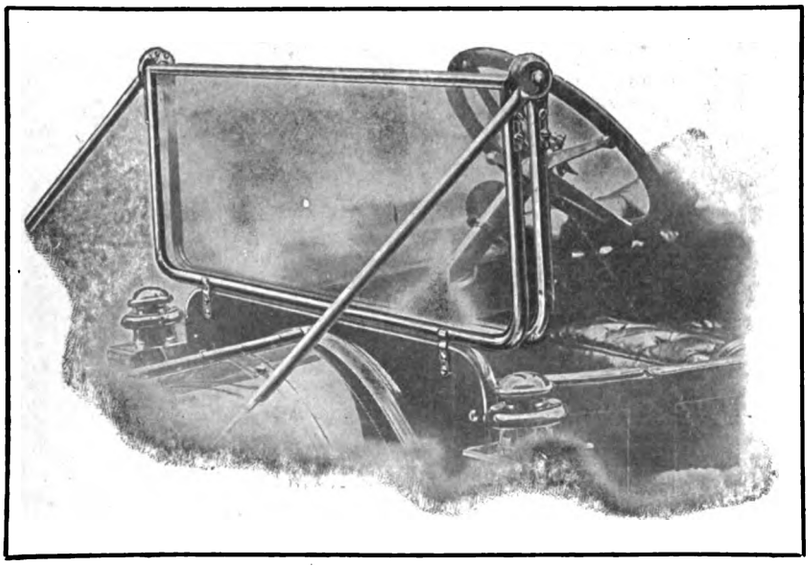
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NO REBOUND

An old and accepted principle to accomplish easy riding applied to the automobile. Not a single experiment embodied in the whole car. It's a phenomenal car, and bound to revolutionize automobile construction where comfort in riding is a consideration. Tire trouble and expense actually reduced. For full information, description and price, address,

REEVES SEXTO-OCTO COMPANY, Columbus, Indiana

KINWOOD WINDSHIELDS

Made by the Manufacturer of One of the Most Comprehensive Lines of Auto Parts Made in America.



Don't delay in sending for 1912 Proposition on KINWOOD WINDSHIELDS.

We have something in this Proposition mighty convincing to the Trade.

You can't afford to omit looking over this Proposition because we are a big factor in the Windshield business today, and can help you in this end of your business nicely. Write now.

The Kinsey Manufacturing Co.
TOLEDO, OHIO

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You Need Speedo

IT'S GUARANTEED

Price
$3.50
With Decarbonizer
High Power Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

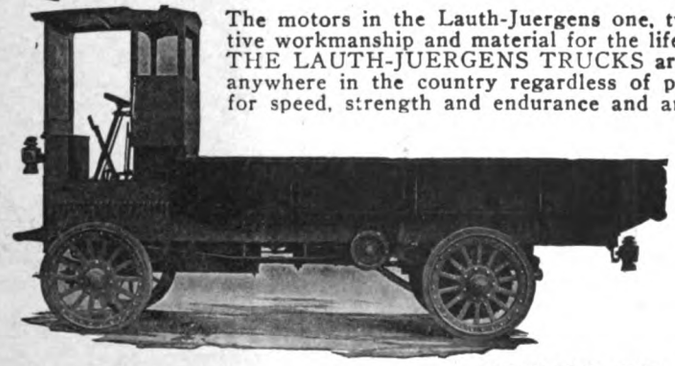
INTERNATIONAL ACCESSORIES CORPORATION

Chicago Branch, FULTON-GRUBB CO., 1150 Michigan Blvd.

Lauth-Juergens

ONE, TWO AND THREE TON TRUCKS

Guaranteed for Life



The motors in the Lauth-Juergens one, two and three-ton trucks are guaranteed against defective workmanship and material for the life of the truck—CAN YOU ASK MORE? THE LAUTH-JUERGENS TRUCKS are the latest and most powerful built trucks to be had anywhere in the country regardless of price or make. They hold an unquestionable reputation for speed, strength and endurance and are built for years of hard service. They are constructed of the best materials obtainable, bear the finest workmanship the world affords and are manufactured in our own shops—TRANSMISSION, JACK SHAFT, CLUTCH, GEARS AND ALL. That's why Lauth-Juergens trucks are real delivery insurance. Send for complete specifications and our 1912 catalogue telling the story of another great success in motor truck building Reliable agents should communicate with us at once for 1912 territory.

Lauth-Juergens Trucks Are Delivery Insurance.

Address: LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

BRANCHES AND AGENCIES

Boston—Lauth-Juergens Motor Co. of New England, 9-11 Harcourt St.
New York—West Side Garage & Motor Co., 160-162 W. 101st St.
Duluth, Minn.—Mutual Auto Co.
Chicago—Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
Newark, N. J.—Merchants Motor Car Co., Essex Building.
Toledo, Ohio—Greasser Motor Co., 100-104 Ottawa St.
Bleil Auto Truck Sales Agency, 453 Dix Ave., Detroit, Agent for Southeastern Michigan.
District of Columbia and Vicinity—Bowles Motor Sales Co., Inc., 1608 14th St., N. W., Washington, D. C.

SPECIFICATIONS OF ONE-TON TRUCK

Motor—Rutenber, four cylinder, water cooled, 4″ bore, 4″ stroke. Carburetor—Schebler, float feed type. Ignition—Bosch high tension magneto, dual system. Transmission—Selective type, four speeds forward and reverse. Clutch—LJ Patent disc, 3 piece, simple and positive. Brakes—Two internal on rear axle, two external on jack shaft. Drive—Double chain. Axles—Ball bearing; front, 1¼″; rear, 2″. Wheels—36″ front and rear, Artillery type. Tires—36 x 3″ front, 36 x 3½″ rear. Frame—Solid angle steel 2 x 3″, supported by long truss rods to prevent vibration. Wheel Base—105″. Tread—56″. Equipment—3 lamps, horn, oil can, full set of tools and jack. Weight—Chassis with driver's seat, 2600 lbs. Price—Chassis with driver's seat, $1950.00 F. O. B. Fremont, Ohio.

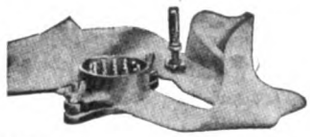
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IMPERIAL VULCANIZER

A real money saver

IMPERIAL VULCANIZER

One ounce of gasoline, a little specially prepared rubber—and in 15 minutes you can repair a puncture in the inner tube



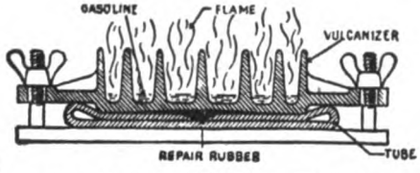
Patent Pending Nickel Plated

This is the vulcanizer you have been wanting all these years. Takes up very little room—weighs 3 lbs.—can be used wherever you happen to be when the puncture comes. No electric current—no steam—the gasoline supplies the heat—the vulcanizer is cleverly designed to automatically regulate this heat. The tube is easily and permanently repaired, practically

a new inner tube in 15 minutes

The price is only $3.50 for the kit with full equipment and enough specially prepared rubber for 40 punctures. Extra repair rubber costs only 25 cts. a roll, postage prepaid.

Sold on a guarantee of satisfaction—or money refunded. At your dealer's or sent by express.

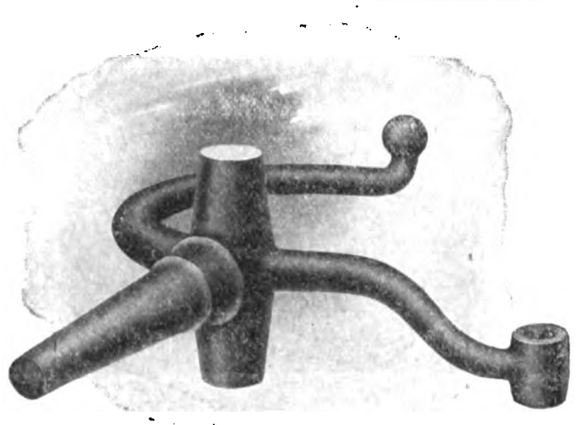


A Word to Dealers—This new Vulcanizer is making a great hit with motorists. If you have none in stock write to us at once. Remember, we guarantee it in every respect.

Address Dept. E.

REPAIR KIT PRICE $3.50

THE McGRAW TIRE & RUBBER Co.
EAST PALESTINE, OHIO.



PIONEERS
in making and treating

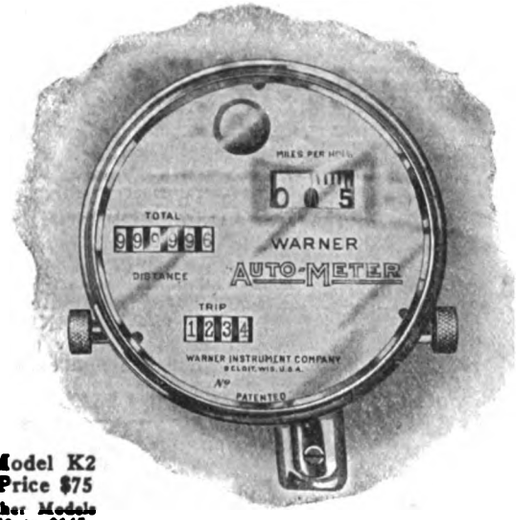
Drop Hammer Forgings

We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements **solicited.**

Prompt Service Guaranteed

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Model K2
Price $75
Other Models $50 to $145.

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AUTO-METER

"The Aristocrat of Speed Indicators"

CONSISTENT Auto Manufacturers are equipping with the Warner Autometer. How can a car be truthfully advertised as thoroughly good throughout when the speed indicator is known to be cheap and inferior?

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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
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Diamond Tires

We could build them cheaper
But We Won't

We would build them better
But We Can't

THE minute you begin to sell Diamond Tires you begin to profit by Diamond prestige, not only in your tire business but in your other departments.

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If you are not getting our little magazine for dealers you're missing something you don't want to. Send in your name today.

The Diamond Rubber Company
Akron, Ohio

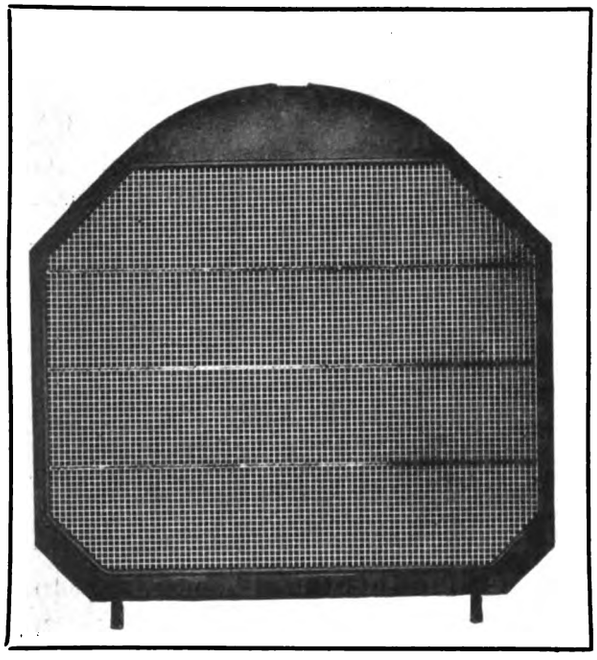
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¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

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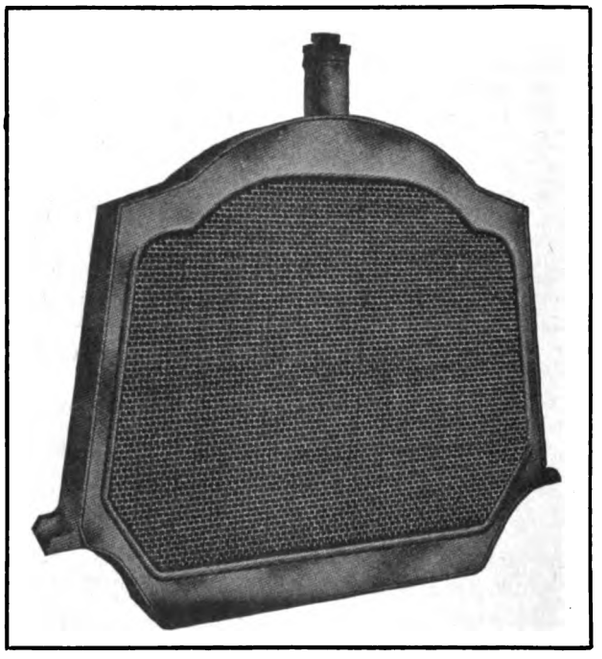
FEDDERS REAL SQUARE TUBE RADIATORS



No square tube "effect" or imitation, but made of individual square tubes. Of course the real square tube is better, that's why the others imitate it in appearance. They can't make the real article at the price.

Furnished with tubes staggered or Mercedes finish, as shown on cuts.

See Fedders Radiators on such cars as Packard, Thomas, Pierce, Haynes, Matheson, National, etc.



FEDDERS MANUFACTURING WORKS, Buffalo, N. Y.

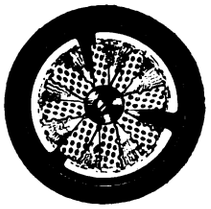
5 to 7 YEARS SERVICE with a GLIDE

Season after season; not a new car the next year or the year after; nothing sacrificed to fads or notions —all built for endurance as well as beauty, strength and test of action, as well as ease and comfort in riding.

The Glide Catalogue for 1912 gives all particulars; tells why the Glide is the car of complete and elegant appointments; why it is, in all respects, the car of Style and seven years service. All Glide cars provided with Glide Self Starter without extra cost. Write for a catalogue and agents proposition.

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WRITE FOR 1912 CATALOGUE

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·THE MIXER·



Price $3.00

Saves 10 to 25 Per Cent

gasolene. Fits intake pipe. Spins around at great speed and "mixes the mixture." We send it to you on trial. If not satisfactory your money is cheerfully refunded.

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Manufacturers of Raybestos Friction Facing, Duplex and Raymond Brakes

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Simple—Isn't It?

This little cam regulates the positive operation which makes the Remy the *best magneto made.* It is made of specially heat-treated chrome vanadium steel; case hardened and ground to size inside and out; fitted to the ground steel inductor shaft with square key. A few drops of oil a year makes it wear-proof.

Remy Electric Company.

Factories—ANDERSON, IND.—Gen'l Office
Service Stations in Every Important City

If It's Plugs, Say BOSCH



Cut is actual size

Pamphlet "W" describes them.

BOSCH MAGNETO COMPANY
223-225 West 46th Street NEW YORK



YOU DO

want a smooth-running motor, don't you?

Equip your motor with a set of "AC STAR" spark plugs and you will be able to run at top speed and throttle down with no danger of back-firing, as the superior design of "AC STAR" plugs prevents pre-ignition.

Send for Booklet

CHAMPION IGNITION COMPANY
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Polarine

The Best Oil for All Motors

When a car starts out lively in the morning and then shows signs of sluggishness later in the day, it usually means something is wrong with the lubrication.

Use **POLARINE** Oil and you will avoid two-thirds of all motor troubles.

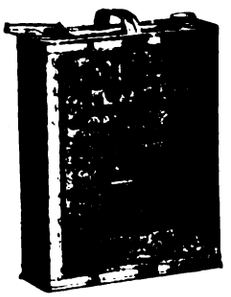
POLARINE is the best automobile oil yet produced.

It gives the maximum lubrication for the amount used. It insures the least possible friction and wear, with full compression and power.

It leaves no carbon deposit.

It feeds freely right down to zero.

Look for the flat, convenient can—just fits in the tool-box. Ask your dealer.



Our free booklet tells all about the Polarine Brands, and contains many useful hints on the care of a car. Write for your copy today to any agency.

Standard Oil Company
(Incorporated)

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For Comfort and Elegance

in the fullest sense, select the Argo Electric. Its luxury is not alone that of handsome fittings and easy upholstery, but is built into the entire car from the silent power plant to the smallest detail.

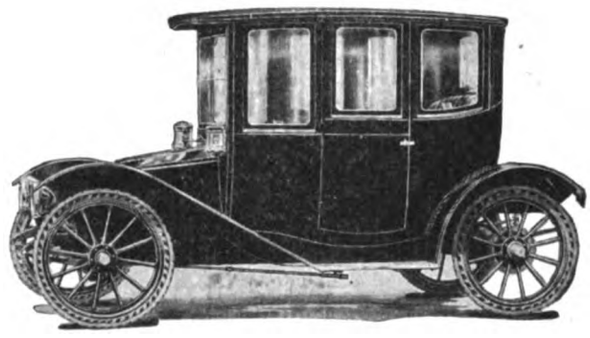
Its beauty is not merely in fine finish but is inherent in its graceful low-hung design, its long, sweeping lines and its pleasing proportions.

THE ARGO BROUGHAM

is so distinctive in every feature that you must see a catalog for description and specifications to appreciate it. Shall we mail our new booklet—postpaid?

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AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both.





(Patented)

By Actual Test

The Sparks-Withington One-Piece-Blade RADIATOR FAN will deliver a greater volume of air with less horsepower consumption than any other fan on the market. Bonafide tests furnished to those interested.

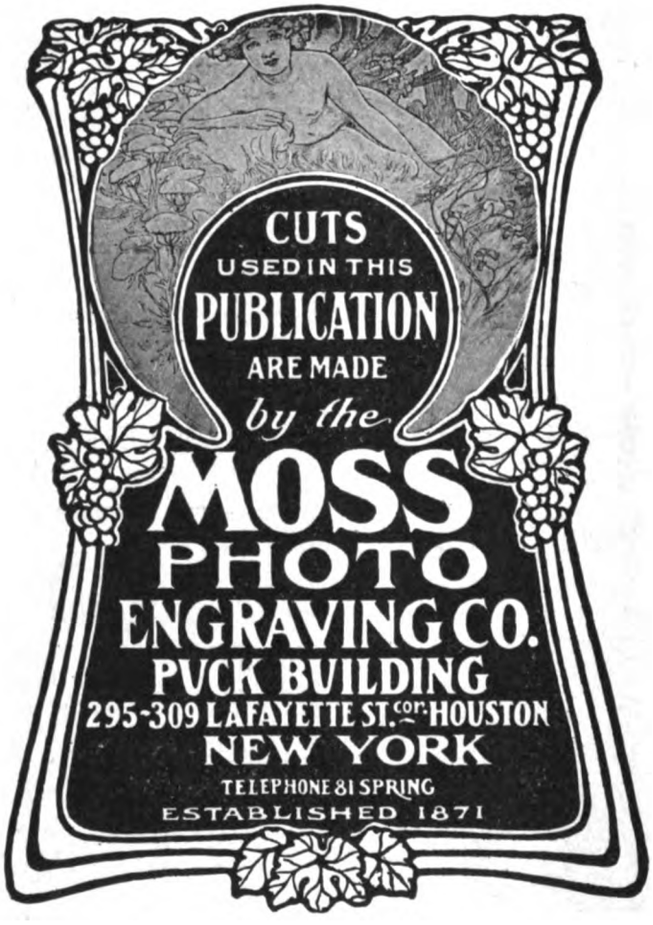
With this assurance, and considering that we are specialists in fan construction where you are not, we desire the opportunity only to prove our claims, and, therefore, request your blue prints or a sample fan for estimate. Out of ten standards no doubt we can give you something without making special tools. That would mean a saving to you.

We will gladly test free of charge and submit report on fans you now employ.

Don't fail to write us when you are ready to consider 1912 contract.

THE SPARKS-WITHINGTON CO., Jackson, Mich.

Battery Boxes — **Hubs Complete**
Ball Bearings — **Flanges**
Brake Drums — **Heavy Stampings**



B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager,
1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

Philadelphia, Pa., 1418 Blavis St.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

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have been approved by leading engineers as the very best for hard exacting service.

If you want to make your car immune to transmission troubles, you should send for complete information regarding the Covert line.



COVERT MOTOR VEHICLE COMPANY
Sales Offices:
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Factory: Lockport, N. Y.

WINTON SIX
Like to Crank?

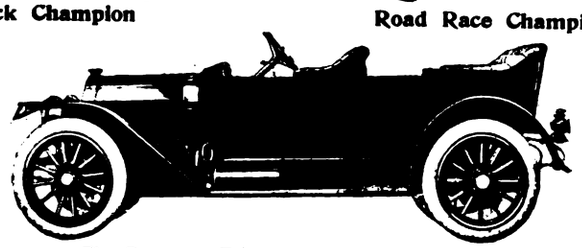
IF you have been cranking your car all these years, don't blame us.

Winton Six cars have always been self cranked. Our Self Starter has been in daily use on our entire output since June, 1907.

Shall we send our catalog?

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426 Berea Road Cleveland, O.

National 40
Stock Champion Road Race Champion



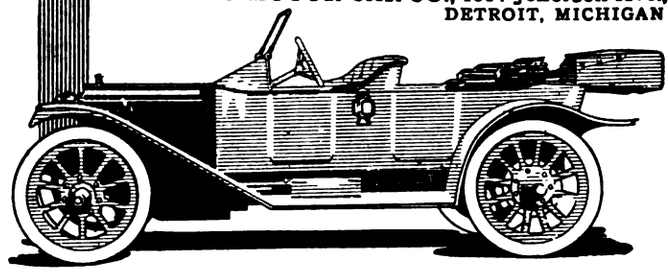
Five Passenger Touring Car, Series V, $2,900
NATIONAL MOTOR VEHICLE COMPANY
1007 E. 22nd Street Indianapolis, Ind.



Our new factory now occupied gives us a capacity of 5000 King cars a year. Our dealers are given splendid backing.

With Full Equipment, Including Self-Starter, $1565

Terms, territory and detailed description on request
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Front Axle Yoke Bolts

You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel—bolts tough and strong and properly hardened for this vital duty.



Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

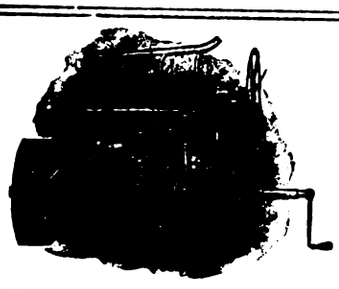
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Cleveland, Ohio

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY
222 N. George Street YORK, PA.



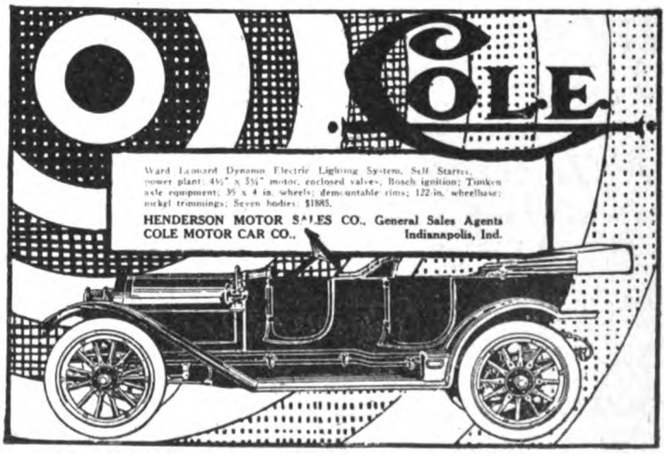
The Leading Cars in every line place their reliance on

THE RUTENBER MOTOR

The Standard American Made Motor for ten years.

THE WESTERN MOTOR COMPANY, Marion, Ind.

COLE



Ward Leonard Dynamo Electric Lighting System. Self Starter. Power plant: 4½" x 5½" motor, enclosed valves, Bosch ignition; Timken axle equipment; 36 x 4 in. wheels; demountable rims; 122-in. wheelbase; nickel trimmings; Seven bodies; $1885.

HENDERSON MOTOR SALES CO., General Sales Agents
COLE MOTOR CAR CO., Indianapolis, Ind.

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THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster, price $1,750; five-passenger Century Brougham, price $1,950. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

U. S. AUTO HORN CO.

AUTOMOBILE **HORNS** MOTORCYCLE

REED, BULBS AND FLEXIBLE TUBING

For sale by leading jobbers everywhere

U. S. AUTO HORN COMPANY
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"INVINCIBLE"

(Trade Mark)

Starter

Adopted by the
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as standard equipment

Description and Prices on Request

INVINCIBLE STARTER CO.
Penobscot Bldg., Detroit

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Manufacturers of High Grade
ROLLER BEARINGS
For All Purposes



Our Consulting Engineering Department is always at your service.

Send for catalog, price-list and specification sheets of sizes.

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Automobile Frames and Special Stampings

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The Motor Lamps with Distinctive Features

There are no other motor lamps on the market with the advantages of Solar Lamps. Solars are always exclusive in style and in quality. They are the strongest lamps as well as the most effective.

In no other lamps can you obtain the Solar Special Short Focus Lead Glass Lens Mirror Reflector—the patented system of double ray light projection which gives two distinct fields of light for town and country use—or the new and exclusive black finish with a metallic lustre which is unaffected by heat or moisture. All of these features are exclusively "Solar."

Do not equip your car or specify equipment to the maker until you have seen all of the Solar advantages. See Solars at any live dealer's or write for the catalog.

Solars are made in all styles for oil, electricity, gas and in combinations.

Solar Lamps

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Sheet Metal Stamping

WE HAVE an exceptionally complete equipment for the manufacture of special shapes from sheet metal including heavy and difficult cold drawing and forming work of Automobile and Motor Truck Parts, such as Step Hangers, Brake Drums, Axle Housings, Torque Arms, Hood Supports, etc. Send us your blue prints. Estimates cheerfully furnished.

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Champion Spark Plugs

Special Designs for Every Type of Motor Made

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TOLEDO, OHIO

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Michelin
Anti-Skids
Do
Prevent
Skidding

Better Than Commercially Perfect

GEARS

Bevel Differential
Transmission
Steering

$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

Brown-Lipe-Chapin Company
H. W. CHAPIN, Gen'l Mgr. SYRACUSE, N. Y.

Specializing
Light Commercial Vehicle Parts
REAR AXLES FRONT AXLES JACK SHAFTS
PROPELLOR SHAFTS HUBS AND WHEELS

Salisbury Wheel & Manufacturing Company
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PERU, IND.

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GREENVILLE, PA.

All Correspondence Addressed to
S. H. PENFIELD, General Sales Manager, Jamestown, N. Y.



MODEL 95—UNIT TRANSMISSION
Brake and Clutch with Raybestos-faced Discs.
25-35 H. P.

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Steering Gears
Transmissions
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For Pleasure Cars and Trucks
Repairing and truing old wheels a specialty. Experimental wheels a specialty. We furnish and apply any style demountable or detachable rim or tire.

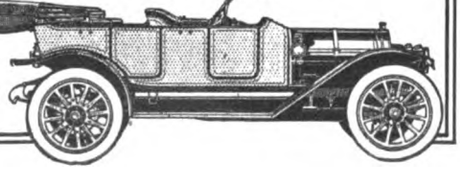


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The Reliance book, "Ignition and Spark Plug Talk," tells why. Supposing you write today and get a copy.
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$2500 to $2900

More than this car offers cannot be bought.

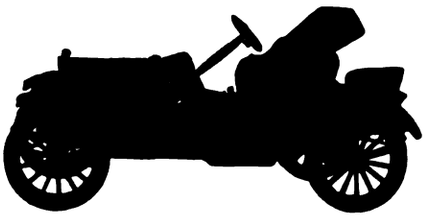
It concedes nothing to its costliest contemporary in structural soundness and strength; in luxury; in ease and comfort; in dignified appearance; or in satisfactory performance — but brings you notable features of design and build that are peculiar to itself.



Model 12 G—$2700
Standard chassis of all Speedwell models has 123 inch wheel base and 50 H. P. motor.

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Metz "Twenty-Two" Water Cooled



$495

1912 Model Completely Equipped as Shown

Four cylinder motor, twenty-two H. P., valves and all moving parts enclosed and dust proof. Chains enclosed in cases running in oil. High tension magneto ignition. 10,000 miles on set of tires. Ask for Book B, with hill climbing guarantee Good dealers wanted in unoccupied territory.

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Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
Model 41—4 Passenger Demi Tonneau.
Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke, 40 H. P. $2400

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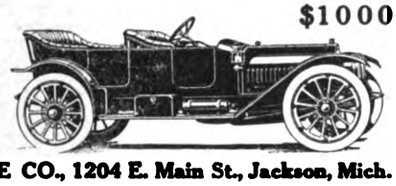
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Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

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Detroit, Michigan

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS - SIX - HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

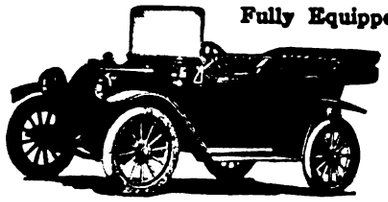
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Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

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MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

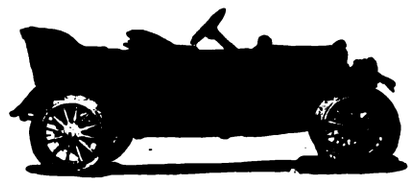
MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY
607 Waterloo Street Detroit, Michigan

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Our Advance Catalog Tells Everything

MARION "35" Five Passenger Touring Car	$1285
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THE MARION SALES CO., Indianapolis, Indiana

Hupmobile

Long-Stroke "32"
Five-Passenger Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires, 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.
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20 H. P. Models

Runabout—$750
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Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring car. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

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THE ULTIMATE CAR
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The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

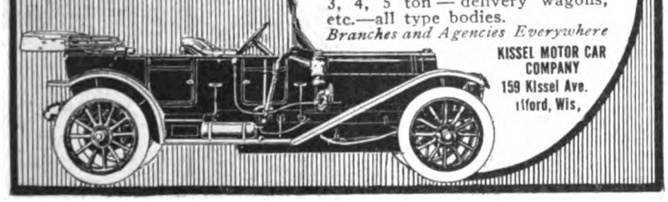
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Every Inch a Car

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159 Kissel Ave.
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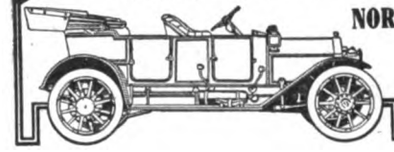


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MARMON

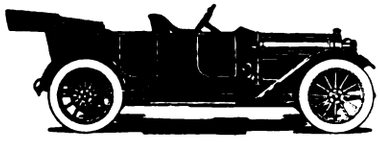
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A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



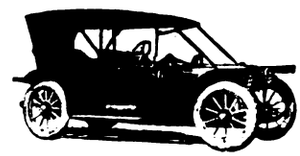
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Indianapolis, Indiana
Sixty Years of Successful Manufacturing

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in.—116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

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WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

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Stands for KLINE KAR Satisfied Owners

4-30	$1700 $1850	4-40	$2200 $2350	6-50	$2800 $2950	6-60	$3300 $3600

The above models completely equipped according to price with Top, Glass Front, Tire Irons, Detachable Demountable Rims, Self Starter, Combination Electric-Oil Side and Tail Lamps, Storage Battery, 4 Speed Transmission.

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Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

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Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

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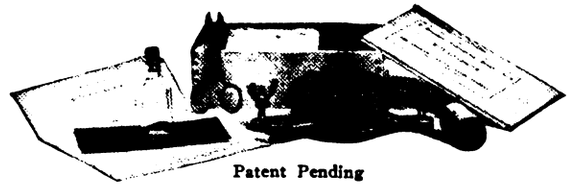
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PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer Ever-Ready

Price, $3.50

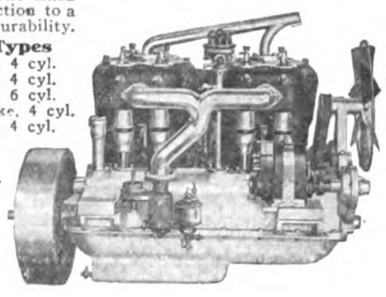
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Wisconsin The Consistent Motors

The crank shaft is of large diameter—a self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. The extra large bearings reduce friction to a minimum and increase durability.

All 4 Cycle—in 5 Types

3¾ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 6 cyl.
4¾ in. bore, 5½ in. stroke, 4 cyl.
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MOTOR TRUCK BODIES

—any size, 500 lbs. to 10 tons; any style. Write your requirements and we will submit suggestion—or, send us blue prints for prices.

We build motor truck bodies exclusively and guarantee Quality and Service.

Single bodies or quantities.

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Letter No. 4

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(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

NORTH AMERICAN BUILDING
PHILADELPHIA

April 4th, 1912.

Messrs. MANUFACTURER, DEALER and COMPANY,
Every City, Everywhere.

Gentlemen--

EVERY MANUFACTURER CAN ESTABLISH A HIGH REPUTATION FOR THE CARS HE BUILDS BY USING ONLY THE BEST OF MATERIALS AND WORKMANSHIP IN THE MAKING.

EVERY DEALER CAN ESTABLISH A HIGH REPUTATION BY GIVING SATISFACTORY SERVICE TO HIS CUSTOMERS.

BUT--neither the manufacturer nor the dealer can maintain this reputation unless the cars they handle are kept in perfect working condition under all circumstances. ACCIDENTS CANNOT BE CONTROLLED BUT REPAIRS SUSTAINED THROUGH THESE ACCIDENTS CAN AND SHOULD BE CONTROLLED BY THE DEALER OR THE MANUFACTURER.

WE WILL GIVE YOU CONTROL OF THESE REPAIRS IF YOU CO-OPERATE WITH US.

TELL US YOU ARE INTERESTED and we will give you our plan.

Yours very truly,
ORGANIZATION COMMITTEE
By Ernest H. Greenwood
Secretary.

P. S. Look for letter #5 on this page next week.

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Hartford Pointers—No. 2

Uniform Speed—and Always Easy Riding

YOU motor for pleasure, and the greatest exhilaration is *speed*—not the speed of a racing car—but uniform, normal driving.

But what is speed without comfort—what is speed unless your car can take ruts and road obstructions without jolt or jar?

Slowing down for car-tracks, cross-walks and other inequalities, means lost time and loss of pleasure, too, yet it is the only safe alternative unless your car is equipped with the Truffault-Hartford Shock Absorber.

This is not an invention that exempts you from the dangers of reckless, haphazard driving, but a device that permits the maintenance of good speed over rough roads without the usual uncomfortable rearing and pitching of the car, and without the possible danger of a spring breaking. The

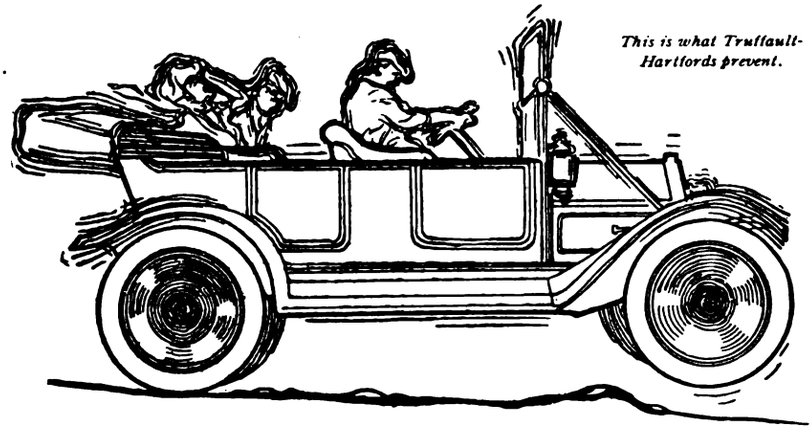
Truffault-Hartford SHOCK ABSORBER

acts as a retard to the violent and excessive action of the spring when the car strikes a rut or obstruction. Instead of the spring yielding to its inherent tendency of contracting with undue force, it comes together easily and gently. The recoil that follows is just as easy and regular, for the Truffault-Hartford exerts the same steady resistance to the upward movement as to the downward.

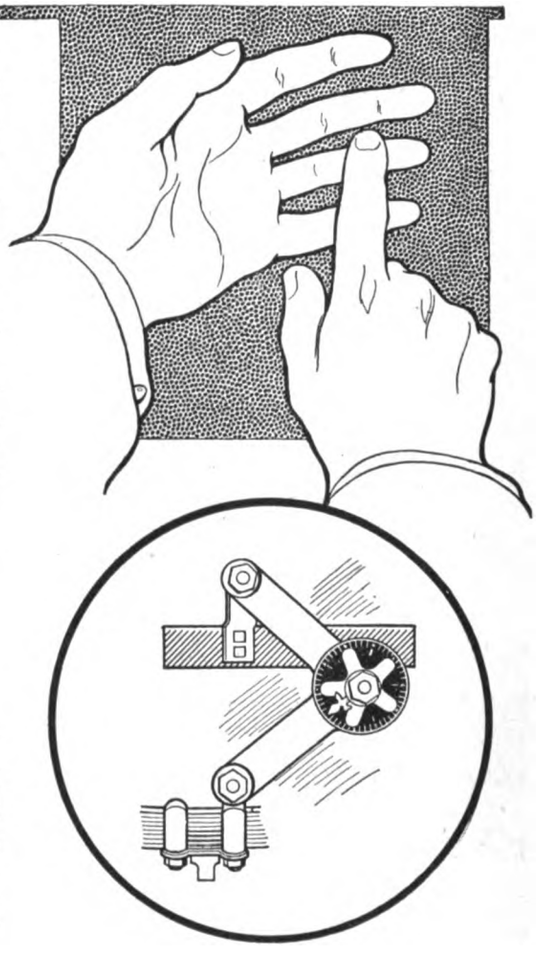
This elimination of jolt and jar accomplishes more than an improvement in the riding qualities of your car—it does more than allow for **better speed. It adds to the life of the engine and tires. For these reasons, motorists who have had the opportunity of noting how much the Truffault-Hartford Shock Absorber contributes to the riding and running qualities of a car, refuse to buy or use a car without this equipment.**

As further proof of Truffault-Hartford superiority, the fact is cited that there are now twenty-two leading car manufacturers in America who regularly include the Truffault-Hartford Shock Absorber on every car they produce.

Four Models—$60, $45, $25, $15.



This is what Truffault-Hartfords prevent.



Get in touch with a Truffault-Hartford dealer and have him explain to you the merits of this device. Our new illustrated catalog covers many vital points. Write for it today.

The Hartford Suspension Co.

E. V. HARTFORD, Pres.

164 Bay Street Jersey City, N. J.

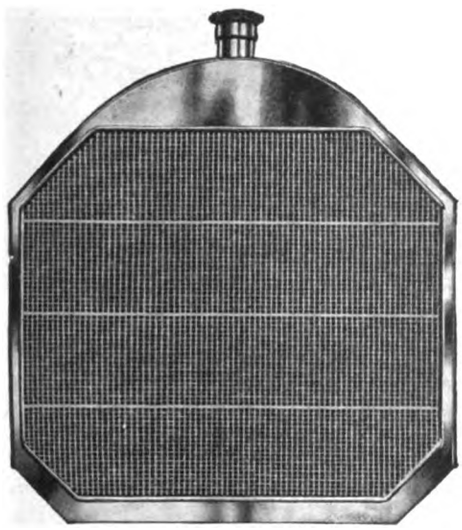
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Since 1897 when we conceived the idea of the shock absorber (six years before the device was presented to the public at large) we had "weeded out" by costly experimenting, year after year, numerous other devices, including the *wedge*, *cam*, hydraulic, air-cylinder, strap spring, spiral spring, spring cylinder, etc. We have proved conclusively—that, so far at least, no other principle than rotary friction has come anywhere near to solving the shock absorber problem, and this is mentioned so that the public may take advantage of the knowledge gained at great expense during a period of 15 years.

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¶Keep in mind the name—MAYO—and you'll never go wrong in the selection of that radiator best suited for your requirements.

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Miller's Pan-American TIRE SAVER



WHAT IT DOES:

Repairs Punctured Inner Tubes. Fills Cuts in Tire Casings, and Repairs Blow-Outs Without Vulcanizing. Increases Tire Mileage.

Consists as illustrated above of:
One Can Pan-American Rubber Cement.
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One Pan-American Tire Plaster.
One Piece High Grade Emery Cloth.
Packed in neat screw top Carton.

Price, Complete with Directions $1.00

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10,000 Michigan Agents
Are Back of this Advertisement

They Are the Living Credentials We Offer In Support of Every Statement We Make

Thirty years ago we started to manufacture carriages. We commenced with a small factory and no agents.

Today we have increased our factory facilities a hundredfold and we have built up the most efficient vehicle selling organization in the whole world—ten thousand live, active agents to sell our products.

These agents know us and our work. They have confidence in everything we say. They are READY to handle any product of the Michigan factories—and put their individual reputation behind everything we produce.

This enables us to manufacture our goods without selling cost. And thus saves this expense to the man who buys the goods.

The Birth of the "Michigan"

In 1909 we started to build automobiles. A simple announcement to our agents disposed of all the cars we could build. No expense.

And thus it has been ever since. Our agents have absorbed our entire product. Thus for representation which has cost other manufacturers fortunes, we have paid not one cent. And that is why we undersell.

The Factory Behind the Car

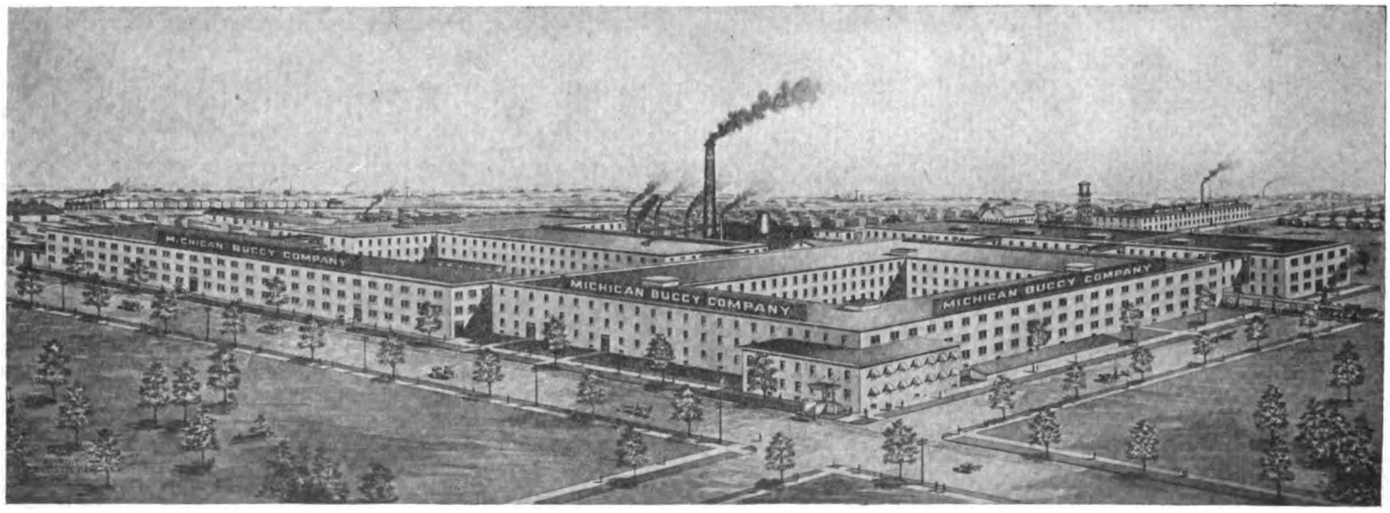
Note the picture of the Michigan factories. They are a monument to our dealers. For all our success has come through our dealers—and their efforts in selling. We take to ourselves the credit of choosing these capable men and of being able to build with their help.

Our Complete Line

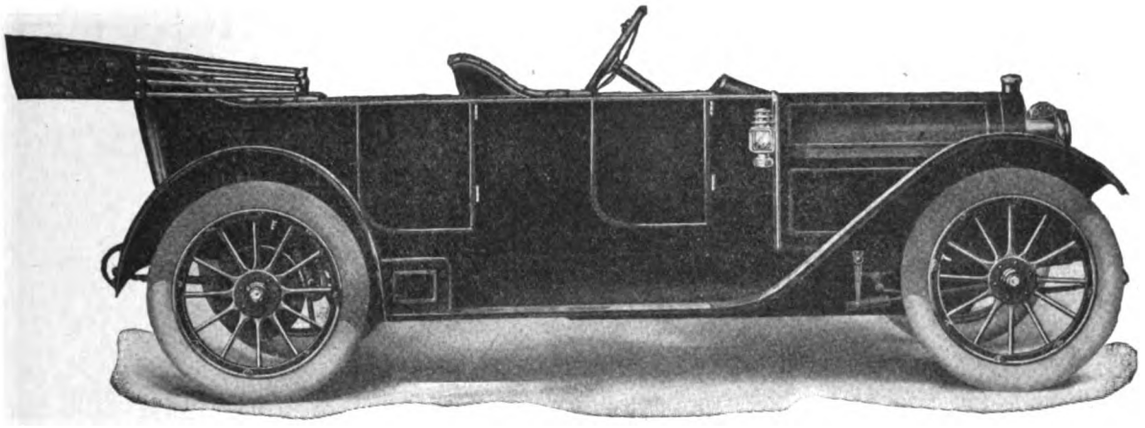
We call attention particularly to our Models K and H here shown.

Each is a masterpiece of its type. Each has met with the unusual favor of motorists and automobile experts.

We cannot in an advertisement do justice to our cars. We can merely note some of the many points. To realize the big values in our machines you must see them for yourself. Or get a catalogue, which describes everything in detail.



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MIGHTY MICHIGAN "40," $1500

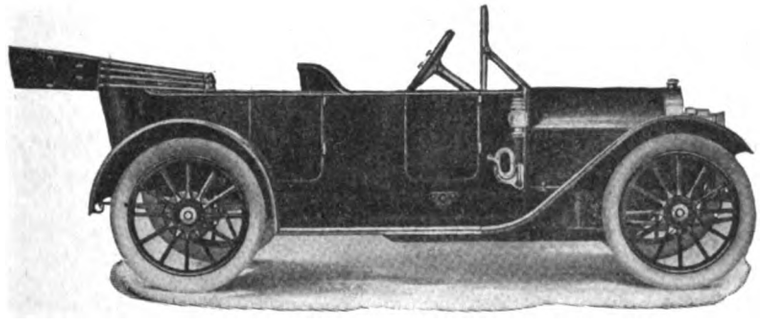
40 H. P. motor, 4¼ x 5¼", three bearing crankshaft. 34 x 4 inch tires, Demountable rims. Nickel mountings. 116 inch wheel base.

A Strong Guarantee

The Michigan Buggy Company backs up every car it turns out—with the broadest, most liberal guarantee that it is possible to place on a motor car. We do not guarantee the car for one, two or even six months. We simply say that if at any time the car proves defective, we'll make it right. And this guarantee means something backed by an old line concern of thirty years standing.

Big Features of Every Michigan Car

SELF-STARTER — We have tried out nearly every self-starter made. The one self-starter that our engineers found to be entirely practical we have approved for use on MICHIGAN cars. It is simple and easy to operate, nothing complicated. Very light and thoroughly dependable. We gave it thousands of tests under all sorts of conditions, and it proved itself absolutely efficient. Nobody likes to crank a car. What folks will insist upon in six months you get **now** on the "Michigan Forty."



MICHIGAN, MODEL H, $1400

The MICHIGAN "33"—Model H—at $1400 affords everything that the average family wants in a motor car save the surplus power and the extra room which comes with our Model K, the "Mighty Michigan Forty." It is completely equipped with self-starter—the best grade Mohair top that we can build, together with side curtains and dust cover—Zigzag Windshield. In fact, everything needed to jump in and drive away. Best materials are used throughout and the same materials go into the machine that we put into our MICHIGAN "40."

MOTOR—Absolutely noiseless in operation. Dust proof. Every moving part (except fan) enclosed. Long stroke, insuring greatest pulling power at low speeds, and utmost economy of fuel.

IGNITION—Tests of all kinds were made before we finally decided on the Briggs magneto. Not only did we find the Briggs the most efficient, but we felt that its strong guarantee gave MICHIGAN agents another big selling recommendation possessed by no other cars of equal price.

CLUTCH—MICHIGAN cars are equipped with clutch of Multiple Disc type. Can't grab—nor slip. A clutch that transmits a greater percentage of power to the rear axle than any other clutch on the market—bar none.

AXLES—Our three-quarter floating rear axle combines all the advantages of both the full-floating and semi-floating types, with none of the disadvantages of either. Hyatt High Duty roller bearings are used throughout.

WHEELS AND TIRES—We use genuine Shortsville A-grade wheels. Known everywhere for their strength. 1½ inch spokes, 12 to the wheel. MICHIGAN cars are overtired also—just to make sure that owners will not be bothered with that big bugbear of Motordom, tire trouble.

BRAKES — One square inch of braking surface for every eight pounds. Brake drums 14 inches in diameter, 2 inches wide. They are lined with Raybestos, making it impossible to burn them out.

FRAME — Extra strong, 5-32 inch steel. Four inches deep, 3½ inch flange. Its extreme strength makes impossible accidents due to weak frame construction, and does away entirely with body squeaks.

BODY—Here's where we have made big capital of our vast carriage building experience. Big and massive, yet graceful, and wonderfully suggestive of character and power.

COMFORT—Easy riding qualities secured by long wheel base, soft springs and luxuriously comfortable cushions. Appointments are perfect—such as you would expect to find only in cars costing $4000.

Motor Car Department

MICHIGAN BUGGY COMPANY

213 Lay Street KALAMAZOO, MICH.

INFORMATION COUPON

MICHIGAN BUGGY CO.,
Motor Car Department,
213 Lay Street, Kalamazoo, Mich.

Please send me catalog describing the "Michigan Forty" and other Michigan cars.

Name .....

Address .....

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FISK TIRES

MR. DEALER:
HAVE YOU SOLD ANY ONE LINE OF TIRES FOR FOUR YEARS WITHOUT BEING CALLED ON TO MAKE A SINGLE REPLACEMENT?

Wm. S. McGregor has a salesroom and up-to-date repair shop in Daytona, Florida. He sells a good number of tires both to his regular trade and tourists. He believes in and sells Fisk Heavy Car Type Tires. IN FOUR YEARS HE HAS NOT MADE A SINGLE REPLACEMENT.

This is only just one specific instance. Another dealer in Illinois reports the sale of 150 FISK CASINGS WITH ONLY TWO CLAIMS FOR ADJUSTMENT. In both these cases the tires showed signs of having been run without sufficient air pressure.

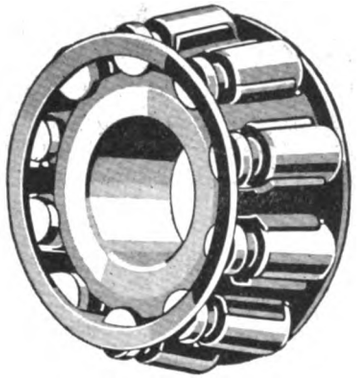
Fisk Tires are made in one construction only—the famous **Heavy Car Type.** This produces a balanced casing that shows equal resistance to wear in all its parts. Our Pure Para Inner Tubes are what the name would signify. The average mileage of both is consistently high.

We would urge any dealer who has reason to wish to better his tire business by selling a new line to communicate with us. We are prepared to convince him that the rapidly growing popularity of Fisk Tires is based wholly on merit.

THE FISK RUBBER COMPANY
Department 23 **Chicopee Falls, Mass.**

Direct Factory Service in 35 Cities

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There is big side pressure on the bearings in your car. It's the side pressure that pushes you along the seat when you steer around a curve.

"End-thrust" we call it in technical talk. And it comes full force on your front-wheel bearings.

Momentum makes the car tend to go straight ahead. When you steer to the right there's "end-thrust" to the left.

TIMKEN
TAPERED ROLLER BEARINGS

The rollers of Timken Bearings carry maximum load and stand the greatest shocks because they do it along their entire length instead of at points as with balls.

And they take end-thrust too, because the rollers are tapered and revolve about a tapered cone, inside a tapered cup.

The stress of load is a constant stress except as it suddenly increases with every hard jolt.

End-thrust comes as a plus stress on top of load and shocks.

Their tapered rollers give the Timken Bearings wonderful ability to meet all the stresses and all the shocks whether they come from the top or the side. Or whether they come from *both top and side.*

This is another of the many reasons why Timken Tapered Roller Bearings are used by the great majority of pleasure and commercial car builders in the wheels of their cars.

It will interest you to learn how many of the cars most familiar to you ride on Timken Bearings. They are named in a booklet "The Companies Timken Keeps." Write for it.

The Timken Roller Bearing Company
Canton, Ohio, U. S. A.

107

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company

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No Manifold Starter at any price is better than this at - $10

The Valentine MANIFOLD STARTER and Gas Lighter

And in addition to a manifold starter for only $10 we also include an electric gas lighting device that enables you to light your lights from the seat.

Remember, please, that there is no other manifold starter on the market at twice or three times the price of ours that is any better—most of them are absolutely inferior. And then we throw in the lighting device for good measure.

By a manifold starter is meant a starter which carries acetylene gas into the intake pipe or manifold with the dying revolutions of the engine as the engine is stopped.

No such device as the Valentine manifold starter and gas lighter can be purchased for less than two or three times the price of ours—$10. Nevertheless the Valentine has no superior.

WE BELIEVE THAT $10 IS ENOUGH TO PAY FOR ANY MANIFOLD STARTER, SO THAT'S WHAT WE CHARGE.

The Lighter Alone is Worth $10. You Get Lighter and Starter, Both for the One Price, $10

DEALERS :

We have some very fine territory to allot. If you will push this proposition get in touch with us.

Our lighting device alone will bring you many times $10 worth of comfort—to say nothing of the starter.

This is practically the only manifold starter that will allow you to run your engine on the magneto on acetylene gas without tearing the starter to pieces or holding down some spring or valve. If you run out of gasolene and are equipped with our Manifold Starter, just turn on the gas and let the car run.

We positively guarantee the Valentine starter and lighter. If you don't like it return it and we'll gladly refund your money.

J. H. Valentine Co., Syracuse, N. Y.

Enclosed please find $5. Send me a Valentine Starter and Lighter, on receipt of which I'll pay the additional $5. This order is based on the understanding that if, after 30 days' use, I do not like the Valentine Starter and Lighter my money will be refunded upon the return of the starter and lighter.

My car is a.....Model.....

No. of cylinders.....

Location of gas tank.....

Name .....

Address .....

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and here is the only 100% efficient Starter that doesn't foul your plugs

Self HANNA Starter

The Hanna Self Starter was the first acetylene starter on the market. Today it is the only 100 per cent. efficient self starter that does not soot and foul your plugs—because it is the only self-starter that accurately and scientifically measures and mixes your gas.

The Hanna Self Starter puts a scientifically correct mixture of acetylene and air into your cylinders when you are ready to start. Not the night before or two weeks before, but when you are ready to start. As a result it cannot help but start your engine.

There isn't any guess work to it. Not only does the Hanna Self Starter provide a 100 per cent. efficient self starter, but it provides the most economical starter. The measuring device does away with any excess of gas. It also thoroughly scavenges all the conducting pipes and valves by forcing clean, fresh air through them back of the gas. This assures perfect working of the starter indefinitely.

There are no moving parts in this starter to become loose, wear out or rattle. It weighs less than four pounds and is easily installed.

Sold under an absolute guarantee of satisfaction. If you don't like it send it back and we'll refund your money. The price is $35 for a four-cylinder car, $40 for a six.

Send $10 with order and we'll ship immediately.

J. H. VALENTINE CO. SYRACUSE NEW YORK

C. L. ACKERSON,
135 Home St., Winnipeg, Canada.
AUTO STARTING DEVICE CO.,
34½ Peachtree St., Atlanta, Ga.
L. E. BELCHER,
318 Main St., Springfield, Mass.
FOGARTY & DICKINSON,
San Luis, Potosi, Mexico.
S. NEAL HALLOCK,
46 Long St., Columbus, Ohio.
HANNA STARTER SALES CO.,
Baltimore, Md.
HANNA STARTER SALES CO.,
704 Main St., Buffalo, N. Y.
HANNA STARTER SALE SCO.,
410 E. Market St., Elmira, N. Y.
HANNA STARTER SALES CO.,
1414 Penn Square, Philadelphia, Pa.
HANNA STARTER SALES CO.,
31 Clinton St., Rochester, N. Y.
E. F. McDONALD, JR.,
2125 Michigan Ave., Chicago, Ill.
W. S. McDONALD,
1001 Majestic Bldg., Detroit, Mich.
MOHLER & DeGRESS,
Ave. 16 De Septembre, No. 18, Mexico, D. F.
A. RAWLINSON,
479 Oxford St., London, England.
F. H. RYAN & H. J. FANNING,
Tunkhannock, Pa.
THE FISK CO. OF TEXAS,
San Antonio, Texas; Dallas, Texas.
THE MOTOR VEHICLE CO.,
903 Boylston St., Boston, Mass.
F. C. TURNER,
22 Rua General Camara, Rio de Janeiro, Brazil.
WATERBURY WELDING CO.,
1148 S. Main St., Waterbury, Conn.
WESTERN MOTOR CAR CO.,
1512 Broadway, Denver, Colo.
PERCY WILLIS,
Waco, Texas.

BOOKLET IF YOU WISH

DEALERS:

You couldn't find a better money-making proposition than this. Your share is large — if you'll push hard.

J. H. Valentine Co., Syracuse, N. Y.
Enclosed please find $10. Send me a Hanna Self Starter, on receipt of which I'll pay the additional $25 (if a four-cylinder car), $30 (if a six-cylinder car). This order is based on the understanding that if, after 30 days' use I do not like the Hanna Starter my money will be refunded upon the return to you of the Starter.

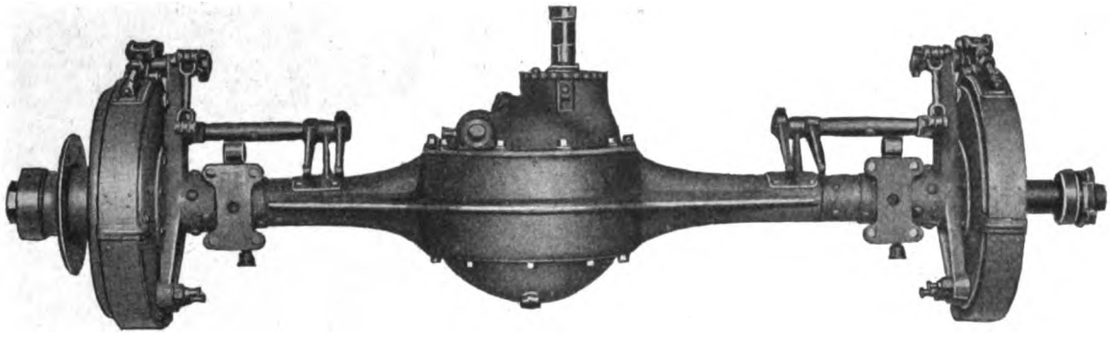
My car is..... Model.....
No. of cylinders..... Year.....
Location of gas tank.....
Name.....
Address.....

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American

American Axles

American



In axle manufacture, as in every other phase of motor car construction, there is a standard beyond which it is impossible to go.

In bevel drive axles, the word *American* implies the topmost height of axle development.

In worm and gear construction, the word "Lanchester"—proved beyond peradventure by ten years of drastic use on all types of motor driven vehicles—stands for that which is beyond betterment.

The association of the two names, *American* and Lanchester creates a double guaranty.

In the manufacture of axles, *American* now typifies the very best in both fields.

American Axles—either bevel or worm drive—can be furnished for cars weighing up to 4,500 pounds and to 60 horsepower.

Annular ball bearings are used throughout, with ample and adequate thrust bearings. Hubs may be equipped with either the annular or taper roller bearings.

THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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Does Anybody Question, for a Minute, the Superiority of Electric Lights?

They did once, but that day is long past.

What has made electric lighting possible and electric lights a practical proposition?

THE MAZDA LAMP

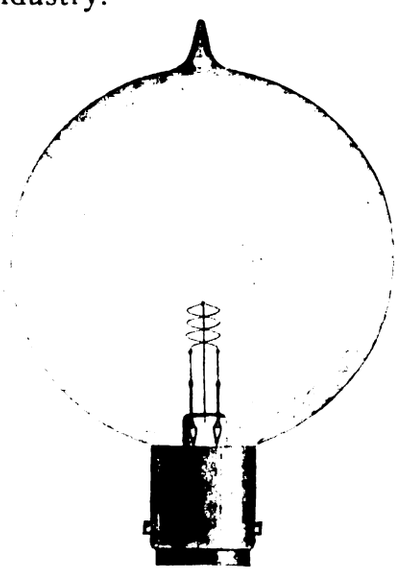
developed in less than four years from a crude and unsatisfactory product to the strong and highly efficient type shown below.

The human element is a big factor in Mazda lamp making. Each lamp must be handled by operatives whose highly-developed skill has been acquired by making lamps—thousands of them.

At the Federal Miniature Lamp Works operatives who make lamps today, are those who have grown up with the industry.

FEDERAL MAZDA

Look For The Label



FEDERAL MAZDA

Look For The Label

This is the headlight lamp. Notice the filament and its position in the bulb. This construction and shape of filament accomplishes two things—strength and the greatest number of light rays given off from a source of smallest area. Getting much light from a small "point" of radiation means that the reflector will gather and **project** a more brilliant and penetrating shaft of light.

The man who uses Federal Mazda lamps—look for the label—will be **sure** he has lamp construction which is the highest development yet attained in lamp making—his lamps will be uniform, each lamp or lot of lamps will be as good as previous ones—and every lamp will combine strength, high efficiency and long life.

Over 500,000 lamps have been placed in service. This means a large replacement business which should be handled by supply dealers, makers of brass lamps and lighting systems, battery makers and automobile manufacturers.

FEDERAL MINIATURE LAMP WORKS

of the General Electric Company

Chicago 301 Fort Dearborn Bldg. **Cleveland, 812 Hippodrome Bldg.**

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Reo the Fifth—$1,055

It Took 25 Years to Build It

By E. R. Olds, Designer

I have spent 25 years in building automobiles. Reo the Fifth is my 24th model.

I have watched every improvement, all the world over, from the very start of this industry.

I have had actual experience with tens of thousands of cars, under every condition that motorists meet.

All I have learned in those 25 years is embodied in this car. And I know of no other engineer in the business who builds cars as I build this.

My Precautions

What I mean is this:

The need for infinite care, for utter exactness, for big margins of safety is taught by experience only.

Countless things which theory approves are by use proved insufficient.

Splendid cars fall down on little points. The maker corrects them. Then something else shows unexpected shortcomings.

Perfection is reached only through endless improvements. It comes only with years of experience. Were I buying a car I would want it built by the oldest man in the business.

For Example

All the steel I use is analyzed, so I know its exact alloy.

The gears are tested in a crushing machine with 50 tons' capacity. Thus I know to exactness what each gear will stand. I used to test them, as others do, with a hammer.

I use Nickel Steel for the axles and driving shaft, and make them much larger than necessary. These parts can't be too strong.

I use Vanadium Steel for connections.

One after another I have cut out ball bearings, because they don't stand the test. I use roller bearings — Timken and Hyatt High Duty. There are only three ball bearings in this whole car, and two are in the fan.

I test my magneto under tremendous compression, and for ten hours at a time. My carburetor is doubly heated—with hot air and hot water. Half the troubles come from low grade gasoline, and this double heating avoids them.

I insist on utter exactness, a thousand inspections, tests of every part. As a result, errors don't develop when the car gets on the road.

Costly Care

I give to the body the same care as the chassis, for men like impressive cars.

The body is finished in 17 coats. The upholstering is deep. It is made of genuine leather and filled with hair.

The lamps are enameled. Even the engine is nickel trimmed. I finish each car like a show car.

The wheels are large, the car is over-tired. The wheel base is long, the tonneau is roomy, there is plenty of room for the driver's feet.

All the petty economies which are so common, are avoided in Reo the Fifth.

My Level Best

This car embodies the best I know. It is built, above all, to justify men's faith in my designing.

Not one detail has been stinted. Not one could be improved by me if the car was to sell for $2,000.

Reo the Fifth marks my limit. I will yield my place as the dean of designers to a man who can build a car better.

Center Control No Side Levers

In this car I bring out my new center control. All the gear shifting is done by moving this handle less than three inches in each of four directions.

There are no side levers, so the entrance in front is clear. Both brakes are operated by foot pedals, one of which also operates the clutch.

This fact permits of the left side drive. The driver may sit, as he should sit, close to the cars he passes—on the up side of the road. This was formerly possible in electric cars only.

The Little Price

The initial price on this car has been fixed at $1,055. But our contracts with dealers provide for instant advance.

This price, in the long run, I regard as impossible. It is based on maximum output, on minimum cost for materials.

We have a model factory, splendidly equipped. Out output is enormous. We have spent many years in cutting cost of production. And this year we save about 20 per cent by building only one chassis in this great plant.

We can undersell others, and always will. But the present price is too low under average conditions. I am sure it must be advanced, and those who delay must expect it.

This car will never be skimped, while I build it, to keep within an altruistic price.

You Can See It In a Thousand Towns

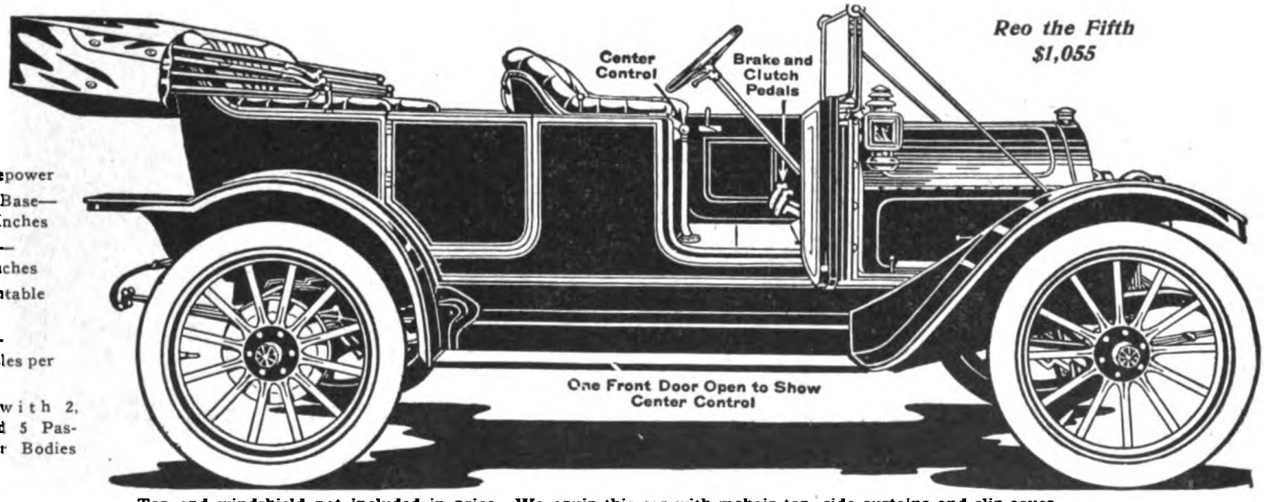
We have dealers in a thousand towns. When you write us for catalog we will tell you the nearest.

Write today for this book. It pictures the various up-to-date bodies, and shows all the interesting facts. The Roadster type sells for $1,000.

Never was a car in all my experience made so welcome as Reo the Fifth. Men miss a treat who fail to see this car. Address

R. M. Owen & Co. General Sales Agents for Reo Motor Car Co., Lansing, Mich.

Canadian Factory, St. Catharines, Ontario



30-35 Horsepower
Wheel Base—112 Inches
Wheels—34 Inches
Demountable Rims
Speed—45 Miles per Hour
Made with 2, 4 and 5 Passenger Bodies

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip-cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $20 extra.

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A Complete Line Of JD SPARK PLUGS 75¢

JEFFERY-DEWITT-CO DETROIT, MICH.

Efficient-Durable Economical







Made With Science

Sold On Honor

"Your Money Back or a New Plug if You Are Not Satisfied"

We can guarantee our "J. D." Spark Plugs because we know they are as near perfection as care and skill can make them, together with unrivaled facilities. From bushing to porcelain they are manufactured complete in our own plants—we buy no parts and depend on the open market for nothing except raw materials. We could not possibly buy any parts that we would be willing to back with that big guarantee we put on our goods—nor could we sell an assembled plug of this quality at so reasonable a figure.

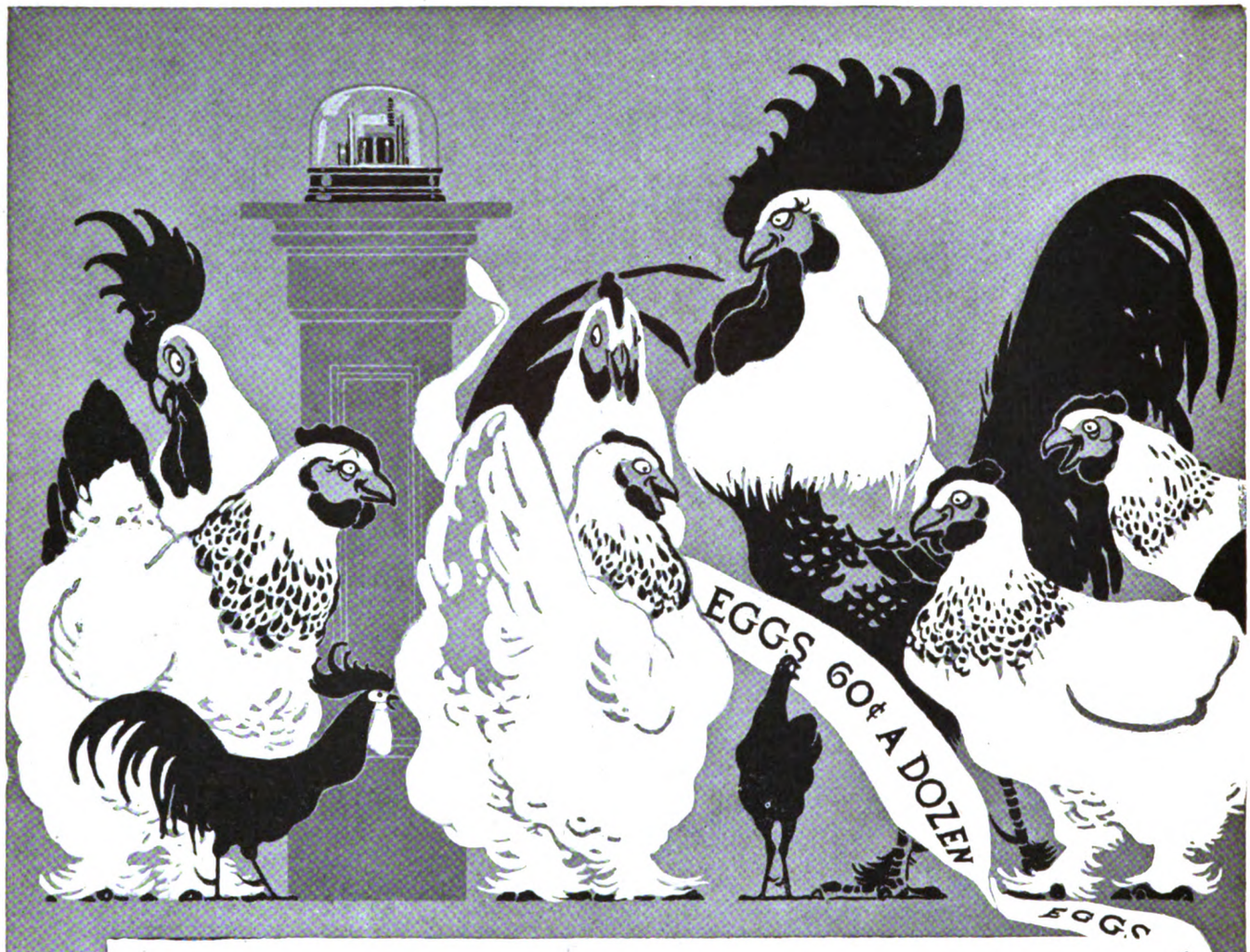
When you buy a "J. D." Plug you are buying the only plug in the market that IS made complete in the one plant—the only plug that the makers can guarantee with absolute knowledge of every detail of the construction, including every step in the porcelain, even to importing the clays and other ingredients.

We have carried our scruples so far that we have made a model pottery all our own, and in it we make the "J. D." porcelain that heat cannot affect. No other porcelain is good enough for the "J. D." Spark Plugs.

You can get these Spark Plugs in three types—Petticoat, Closed End and Conical. If your dealer hasn't the kind you want—we will forward prepaid upon receipt of price—75 cents.

JEFFERY-DEWITT COMPANY, 65 Butler Ave., Detroit, Mich.

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When Hens Don't Lay, Up Goes the Price of Eggs

When your grocer asks five cents *each* for eggs, he doesn't give you a bit better product than when he charges twenty cents a *dozen*. *Summer* eggs are just as good as *winter* eggs. The difference is in the *quantity*, not in the *quality*. The poultry man has the same overhead expense on each hen. But he has to charge *more*, because her output's *less*.

The *Stewart Speedometer* output is *always* large. *Eighty* per cent of the speedometers made are *Stewarts*. The price is *small* because the output's *big*. If we didn't make so *many*, it would cost as much as *any*.

Magnetic principle — jewel bearings — wearing parts hardened and polished — open dial — large figures — easily read — absolutely accurate — 100,000-mile season odometer — 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft, drop forged swivel joint, noiseless gears.

"ALWAYS ON THE JOB."



Speedometers, $15 to $30
Clock Combinations, $45 to $70

STEWART & CLARK MANUFACTURING CO.

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston London
Cleveland Philadelphia Minneapolis Indianapolis Kansas City Paris

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MAY WE HAVE YOUR LAYOUT

Of Bearing Installation?

¶ We can save you money, time and trouble—in other words, show you a short cut to satisfactory bearing installation.

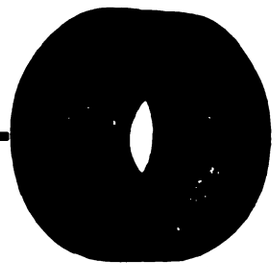
¶ The successful use of New Departures in 60% of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established.

¶ This fact also constitutes a good reason why you should send us your layout and give our engineering and sales departments an opportunity to place our proposition squarely before you.

¶ Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service.

The New Departure Mfg. Company

BRISTOL, CONN.



1016 Ford Bldg. DETROIT, MICH.

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$850 Now Buys a Car of Real "Class"

Empire 25—the "big brother" of the Empire Roadster—invades the field with striking new characteristics. With the efficiency of the highest type cars and with the splendid lines of $5000 cars, "The Little Aristocrat" presents wonderful new opportunity.

Empire 25

"The Little Aristocrat"

The Big Brother of the Famous Empire Runabout

Here is a marvelous little touring car.

It is called "The Little Aristocrat" because it is **aristocratic**—both in **appearance** and **performance.** It is its appearance that makes this car distinctly different from all other cars built to sell at the price asked for the Empire 25.

A glance at design and specifications will indicate with what accuracy we have followed the general lines of cars in the $5000.00 class. We do not exaggerate when we say that "The Little Aristocrat" is a $5000.00 car **boiled down.** It is a small edition of the highest priced **quality** car that money can buy.

The same exclusive grace and beauty—the same comfort, safety, efficiency—the same **atmosphere** that has lent enchantment to these **larger** quality cars will be found to apply, point by point, to "The Little Aristocrat."

All is faithfully duplicated—all but the needless **size** and **power** and **price** which half a million prospective buyers have judged **unnecessary** as well as hopelessly **prohibitive.**

The Empire 25 is the utmost in roominess and comfort. It has **room** enough and **power** enough to carry five people anywhere. No hills can stop it. No car traveling 40 miles an hour can overtake it. No conditions are too difficult for it.

The success of the Empire in the hilly New England States has qualified it for service everywhere.

The Prize Design

No car outside of the $5000 class excels The Little Aristocrat in superb design.

This design is the result of a contest in which we offered a prize to the body designer whose specifications we accepted.

Nor did we stop with the mere **design.** We carried our big idea into the **finish** as elsewhere—finished the Little Aristocrat in Empire **Blue** and **Black Enamels,** the royal sign of **Quality.**

The upholstering we made **luxurious** and inviting. The seats we made **extra** wide and deep and the spring cushions **extra** thick and comfortable.

The doors also we made extra large, and with inside handles to facilitate getting in and out. Interior equipment throughout is only such as to please the most fastidious.

The dash and cowl we made of aluminum in one piece, thus following the custom of the **highest priced cars.**

The Steering Wheel we built extra large. It is 17 inches in diameter; most cars have 15 inch Steering Wheels.

The Steering Knuckles as well as the **axles** we made extra heavy for greater strength and safety.

The Clutch is disc type, Raybestos face, 9 inches in diameter instead of 5, the kind commonly used on cars of this size.

Big Hubs for style—big Artillery Wheels equipped with big tires for easy riding, tire-saving and maximum ground clearance—a free running board and fenders of the most approved type. Serve to put class and character into this car.

In short we give this car a distinction all its own. We built into it an appearance destined to attract, interest and gratify the great class of prospective buyers in the market for quality only. **And we succeeded!**

Details of the Perfect Mechanical Efficiency of the Empire 25:

Motor—25 H. P., 3½-inch bore, 4½-inch stroke—cylinders cast in pairs.

Cooling System—Large radiator in conjunction with a belt-driven fan. Circulation effected by the thermo-syphon method.

Valves — Fully enclosed, adjustable for wear.

Lubrication—Constant level, force feed.

Ignition—High tension magneto, set spark.

Clutch—Disc clutch, dry plate type, Raybestos faced.

Control — Single lever, center control. Throttle lever above steering wheel. Clutch, service and emergency brakes operated by foot pedals.

Steering—Full worm and gear type.

Brakes—Two external, contracting. Two internal, expanding on rear wheels.

Transmission—Three speeds forward and reverse, selective type, mounted on annular bearings. Unit power plant.

Gears—That are silent even when shifting.

Rear Axle—Semi-floating type.

Front Axle—I-beam section, drop forged. The size of the steeirng knuckles would do credit to a car twice the weight of the Empire.

Springs—Three-quarter elliptic rear, semi-elliptic front.

Wheels—Selected second growth, artillery type. 32-inch, quick detachable rims.

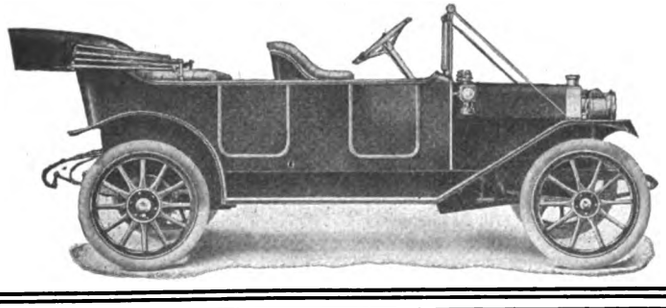
Wheel Base—104 inches.

Body—Aluminoid steel, wood trimmed; fore-door, full vestibule, straight lines from front to rear, ample room in tonneau, seats wide and deep, buffed leather cushions comfortably slanted, inside handles on doors.

Frame — Pressed steel, channel section, dropped, giving low center of gravity and easier riding qualities.

Gasoline Tank—Capacity, 12 gallons.

Standard Equipment — Includes magneto, gas lamps, side oil lamps, tail lamp, tools, repair kit, tire pump, jack and horn.



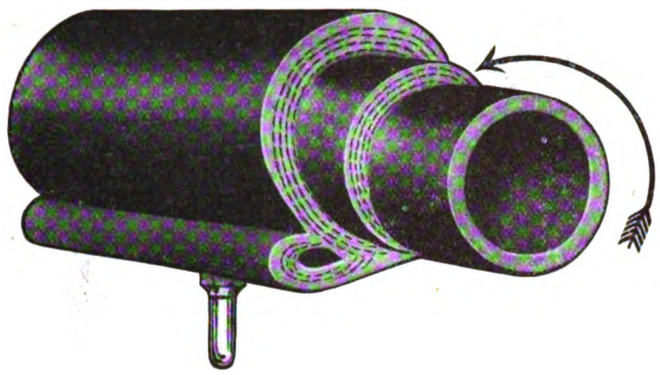
Mr. Dealer: This car should inspire **immediate action** on your part. There are people in every town, city and hamlet in the U. S. who will sit up and take notice of "The Little Aristocrat."

We have a wonderful proposition to make you. You should get it. You should also let us tell you even more about this splendid little car. Write us today.

The Empire Automobile Co.

224 Massachusetts St. Indianapolis, Ind.

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There Is Only One "INNERSHU" The Genuine Bear This Mark

"INNERSHU"

TRADE MARK

Look for the Red Circle Trade Mark. Accept No Other

Makes Tires Puncture Proof Blow-out Proof

We'll go still further and say that Innershu eliminates 90 per cent. of tire troubles. Let that fact sink in and remember that Innershu is

Sold and Recommended by Over 2500 Dealers

and by every prominent jobber in the country. 1911 was the biggest year and claims for replacement amounted to less than one tenth of one per cent.

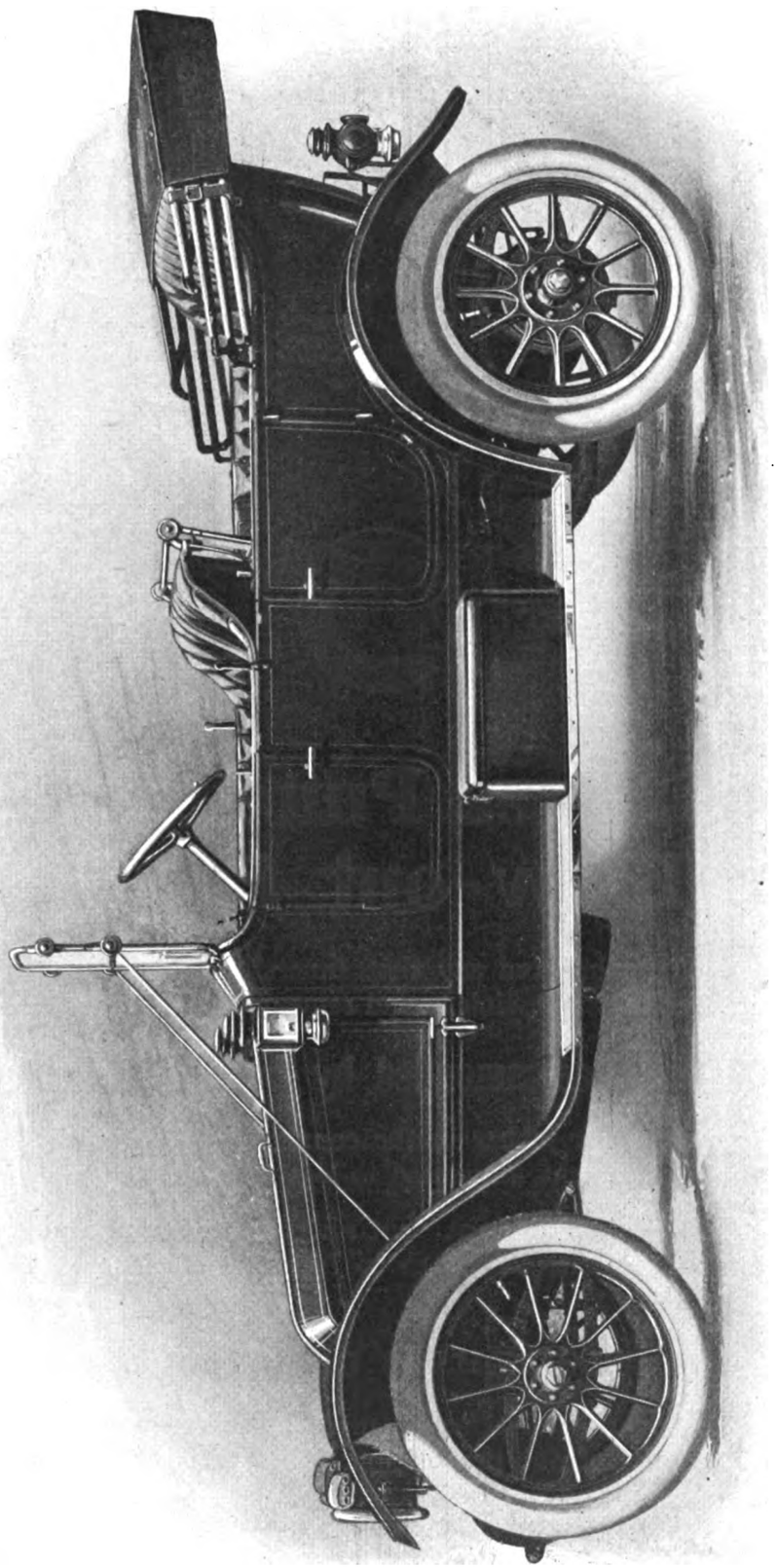
We are dealing in facts not "hot air" and the Innershu facts are the strongest testimony in the World as to Innershu efficiency. We guarantee absolute satisfaction.

WE HELP DEALERS IN MAKING SALES

The agency for Innershu means more business—more profits for you. Write for full details of our proposition.

INNER SHOE TIRE COMPANY, Grand Rapids, Mich.

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Franklin Automobile Company
Syracuse, N. Y.

Franklin "Little Six" 30 H.P.
Twenty-eight hundred dollars at the factory

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

No Rules Necessary

IT is not necessary to lay down any set of rules for the proper operation of the TUTO Horn, for its low and its loud notes are made to use in a logical way, just as you would speak in making a request or in the giving of a warning of imminent danger.

¶ There is no juggling required to get this "two-tone" effect, as is necessary when a bulb horn is supplemented by the one-note loud warning signal. A natural pressure on the TUTO button gives a low-abrupt-signal which is adequate for 90 per cent. of the warning. A full pressure on the same button instantly gets the loud-abrupt-note for emergencies or for use where the low note does not attract attention. From the low to the loud note, does not require any movement of hands or feet, as is necessary when going from the bulb to the button or to a foot pedal. This is made possible by placing the button on the steering wheel and right under the thumb.

¶ The TUTO horn is in a class by itself, as it actually works for your protection and is the only warning device which can be used effectively at short ranges and where every effort must be employed in the control of the car. The so-called long range warning signals of the one-loud note character, is very incomplete for modern motor car travel, as it is absolutely impossible to get a low abrupt signal of any effective duration from these warning devices and therefore they serve only as a supplement to the old inadequate bulb horn and add unnecessary duplication of accessories on the otherwise clean-cut car design of to-day.

¶ The TUTO horn operates in such a natural manner, that no thought or practice is required in the getting of an instant signal of any duration, either low or loud as occasion demands Therefore, it is the only warning signal which is completely adequate and best fitted for the standard equipment on modern motor cars.

The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen."

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This is the logical moment to think about next year's business.

Arrival of the Spring touring season multiplies responsibilities for tire dealers.

Thousands of cars which have been in winter retirement soon will be in service again. Your customers will want tires.

What tires are you going to sell them?

There are two important facts you should carefully consider in mapping out this season's campaign—the immediate requirements of your customers and the future of your business.

If you start right this Spring—establish your reputation for reliability—you not only satisfy your customers, but you lay the foundation for next year.

Once you satisfy a customer it is an easy matter to sell him again. Enough satisfied customers absolutely insure you a profitable business. Therefore, your permanent success as a tire dealer depends entirely upon the quality of the tires you sell.

United States Tubes

are made of the strongest, toughest rubber compound that can be produced by four tire makers working as a unit.

They are made of a rubber compound that will resist the deteriorating effect of age almost indefinitely.

They are absolutely uniform in quality and thickness.

Putting it concisely they are made by the United States four factory method.

Yet they cost no more than you are asked to pay for other kinds.

United States Tires have wearing qualities not possessed by other tires because they are made different from other tires.

They are the product of four great factories presided over by four groups of experts presenting an aggregate of tire-building knowledge not even approached by any other tire concern.

In United States Tires these experts have assembled the strongest individual points of four world-famous brands of tires.

Tires made as these tires are made offer you an absolutely certain foundation upon which to build up a big, lasting, profit-yielding business.

And they cost no more than other kinds.

UNITED STATES TIRE COMPANY

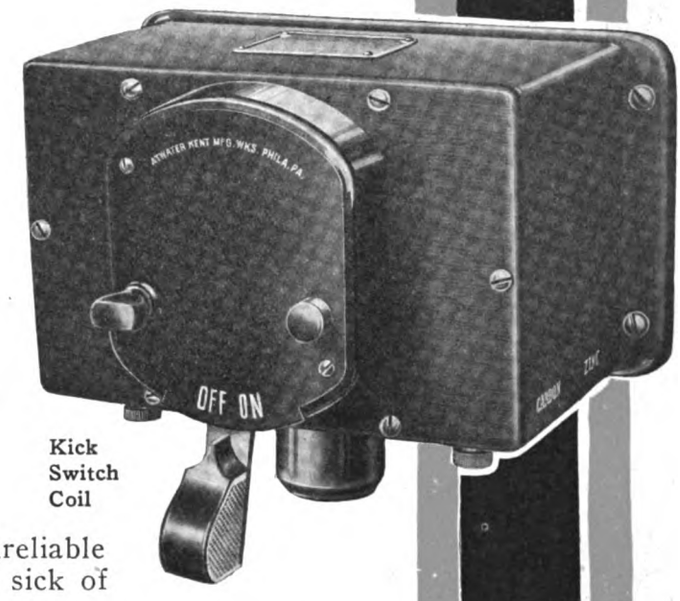
New York

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The Atwater Kent Ignition System

Prepare For Summer

CONSIDER your ignition problem now.



Kick Switch Coil

Not when the old troubles have re-asserted themselves—not when you begin to have haunting suspicions of spark plugs, cables, coils, interrupters, carbureter and gasoline—not when you grudge the time it will take you to make the change and cling to the old unreliable system until you are thoroughly sick of the whole matter.

Change to an Atwater Kent System now before your car goes into service for the summer, and get the highest possible efficiency from your motor.



With it you can get better results than with the best dual system at less than half the cost. There is practically no wear, and its single simple adjustment seldom requires attention.

It is easily installed on cars of every make and model. In the entire system there are but three moving parts and one contact—no commutator, relay or vibrating coils are used. No more simple or efficient ignition device is made.

We are always glad to help you with your ignition problems. Write for new illustrated booklet "D" with full description and interesting ignition information.

Atwater Kent Mfg. Works

46 N. Sixth St., Philadelphia, Pa., U. S. A.

NEW YORK.....E. J. Edmond Co.
BOSTON.....F. R. Parker Spec. Co.
CHICAGO.....Motor Car Supply Co.
SAN FRANCISCO, Chanslor & Lyon M. S. Co., Weinstock-Nichols Co.
MILWAUKEE....Julius Andrae & Sons
OMAHA.....Omaha Rubber Co.
CHATTANOOGA.....Sanford Bros.
DALLAS.....Fisk Co. of Texas

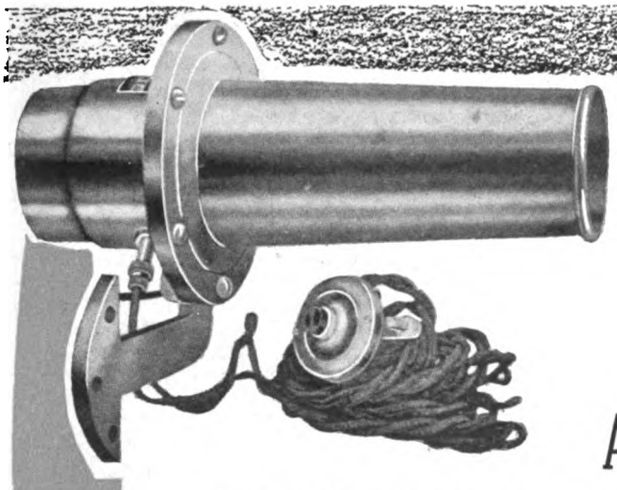
Huntingdon, N. Y.,
February 21, 1912.

Atwater Kent Mfg. Works:

Gentlemen—I have been using your Unisparker now more than two years and find that I can get from 2,000 to 3,000 miles out of a set of six dry cells and have never had any trouble with this system. It certainly has given me A-1 service, and is still in first-class shape. Very truly yours,

(S) Thomas Doran.

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The Newtone

A touch of the button—

the warning note is spontaneous; powerful, clear, abrupt—a perfect danger signal. It's a powerful, melodious note, that never fails to warn, yet still retains an air of courtesy; that harsh, rasping sound, so obnoxious to the refined motorist, is entirely eliminated.

In crowded city traffic where instantaneous warning is vitally necessary, where there's no time to fumble for bulb or pedal—the **Newtone** renders perfect dependable service. In the country—on the winding road where a warning of approach far ahead is necessary, the **Newtone** is indispensable.

Nowadays It's the NEWTONE—"The Mile-Away Motor Horn"

The clear, powerful note it produces, the wonderful efficiency and economy of its tiny motor, the superior workmanship and facilities of a factory that makes over 80 per cent. of the automobile horns in America, has made the **Newtone** the most popular warning signal.

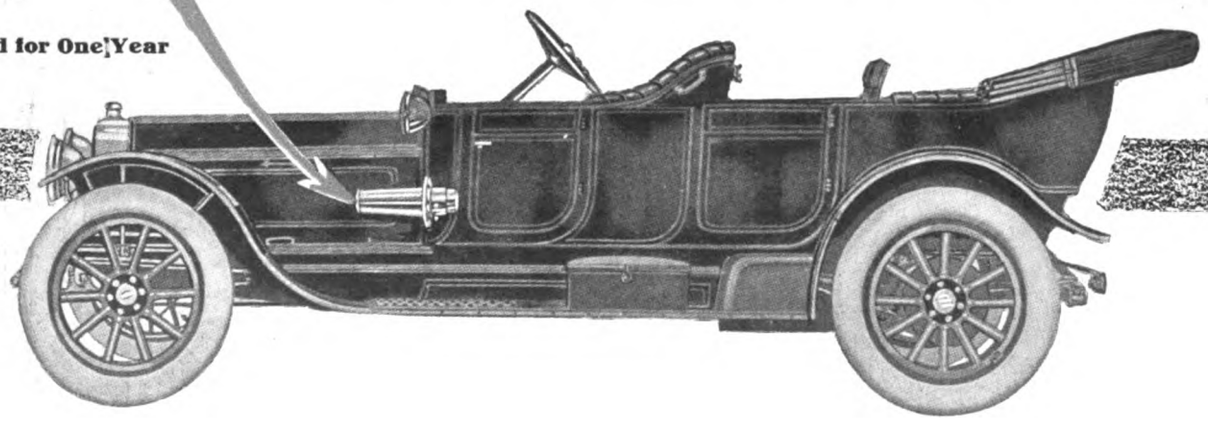
A little over a year ago the **Newtone** was first introduced to the public. Since that time thousands upon thousands have been sold; for the first six months even our unequalled facilities were inadequate to supply the demand.

The new electric motor which operates the **Newtone** is the real secert of its superior efficiency in warning and economy in operation. The fields of this new motor are made up of 75 very thin discs of special steel, thoroughly insulated. This new field construction produces more power, with practically 50 per cent. less current consumption of any other electric driven horn of this class.

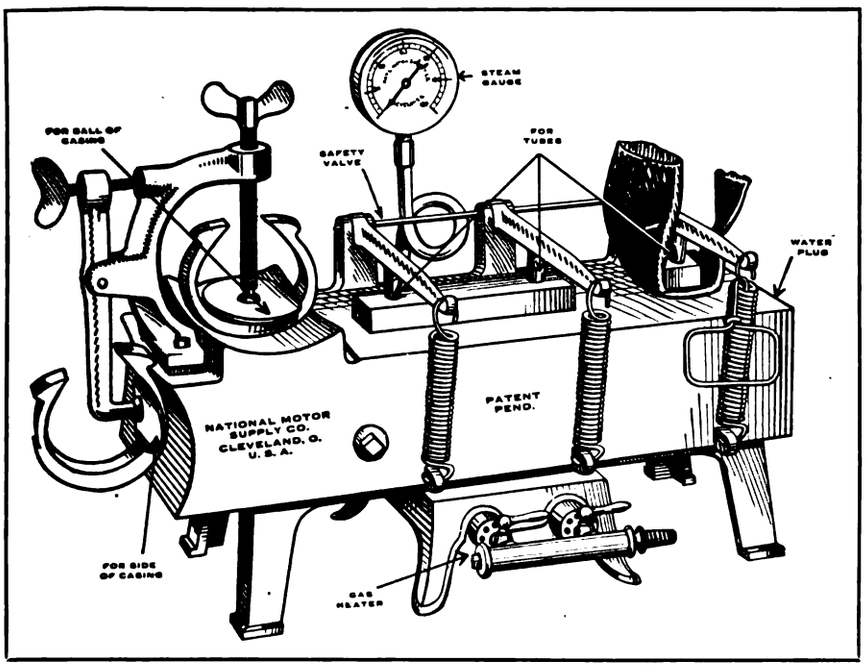
The Chief Engineers of three leading American Automobile Manufacturers after a "Break-Down" Test stated that in their opinion the Newtone Motor Horn is the BEST warning signal made.

The Newtone Sells for $20.00 and is Guaranteed for One Year

Automobile Supply Manufacturing Co. 220 Taaffe Place BROOKLYN, N. Y.



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WHOSE POCKET GETS THE Vulcanizer Dollars In Your Vicinity?

NATIONAL GARAGE VULCANIZER

The one big money earner at a price anyone can afford to pay. Vulcanizes three tubes and two casings at a time.

HEATED BY EITHER GAS OR GASOLINE

SPECIAL OFFER **Garages and Repairmen, write for full description and special offer, whereby you pay us after the machine has earned its cost. Don't miss this opportunity.**

"NATIONAL" PORTABLE STEAM VULCANIZER FOR INDIVIDUAL CAR OWNERS



DEALERS: This is the machine you want to sell to your customers. IT WILL STAY SOLD, and make a friend of every buyer. Nearly 30,000 now in use. It is a big seller, and your profits ARE RIGHT. Repairs both tubes and casings of any size in the country or anywhere. Brass body partly filled with water, and heated by wood alcohol lamp. STEAM ELIMINATES ALL DANGER OF BURNING THE TIRE. Heat control perfect. Sell it to your customers on trial. If they don't like it, give them their money back, and we will do the same for you. Write for the agency in your town, and get the benefit of our large advertising campaign. We will furnish you free one of our handsome red signs for your window. Do not accept a substitute from your jobber. The "NATIONAL" is the original and only perfect portable steam vulcanizer. Beware of inferior imitations. Write today for dealer's discounts. **Price Complete, $12.00.**

BE SURE TO STATE WHICH SIZE VULCANIZER INTERESTS YOU

THE NATIONAL MOTOR SUPPLY COMPANY

Home Office and Factory, 1904 Euclid Avenue, Cleveland, Ohio

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Overland

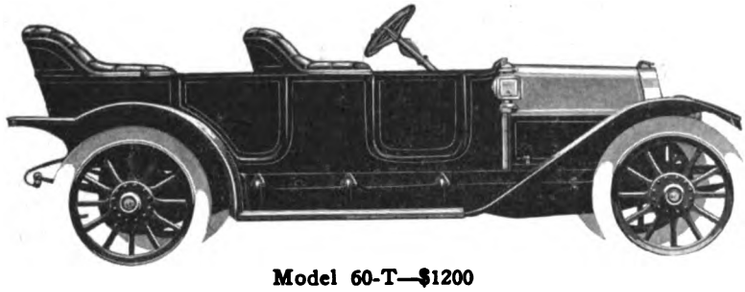
THE greatest difference in popular priced cars today is the difference in price. And this is entirely due to the size of the plants that produce them.

Our thirty-five horsepower touring car is priced at $1200. You seldom find a car of this size and type much below $1500 for the very simple reason that no other factory can produce it for this price. If they could they would. So why should you pay the difference?

Compare values and you will quickly realize the utter folly of paying $1500 for a car that can offer no more than our Model 60 at $1200.

Write for a catalogue. Please ask for book 1-44.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, April 4, 1912. No. 2

AMALGAMATION NOW IS ASSURED

Board of Trade Sure to Be Merged With N. A. A. M.—Velie "Forgets the Past" and Enrolls in N. A. A. M.

Although it now is absolutely certain that the Automobile Board of Trade will be merged with the National Association of Automobile Manufacturers, nothing further to that end was done at the regular meeting of the N. A. A. M. which occurred in New York yesterday, 3d inst., simply because nothing could be done.

The conference committees of the respective organizations — Messrs. Waldon, Bennett and Pope, representing the N. A. A. M., and Messrs. Hanch, Davis and Kittredge, representing the A. B. T.—have had several meetings, and were to have again conferred this week, but a number of things served to prevent and matters remain as they were.

Both organizations being corporations there are a number of legal knots to be untied before any amalgamation can be brought about, and the conference committees are engaged chiefly with the task of untying these knots and reconciling minor differences which, though small, may delay the actual amalgamation for two or three months, or possibly until early fall.

The changed and harmonious spirit of the times which is reflected by the pending merger of the two organizations was further exemplified by the election to membership in the N. A. A. M. at yesterday's meeting of the Velie Motor Vehicle Co., of Moline, Ill., in the person of L. M. Fuller, its secretary. Most of the members of the N. A. A. M. are members also of the Board of Trade, and it is only a little more than a year ago that the Velie company was at their throats with suits for $500,000 for damages due to alleged conspiracy growing out of the late and sometimes lamented Selden patent. The fact that the Velie people have forgotten and forgiven the past, therefore speaks for itself. Other than the addition of the Velie company to the roll, everything else done at the N. A. A. M. meeting was of a routine nature.

Gray & Davis Become a Corporation.

Gray & Davis, of Amesbury and Boston, Mass., the well-known makers of lamps and electric lighting systems, have converted their business into a corporation under the style Gray & Davis, Inc., their charter, which places the authorized capital at $1,250,000, being issued late last week. William Gray remains in control, and will fill the dual offices of president and treasurer. The other officials are: Alexander Churchward, vice-president; D. B. Kerr, secretary; D. Henry Elkins, assistant treasurer, and William B. Moses and William H. Gray, directors.

All of these gentlemen have been connected with Gray & Davis for several years. The only new men who have been brought into Gray & Davis affairs by the firm's transformation into a corporation are Turner & Tucker, the Boston bankers, who have sold in the open market $250,000 worth of the preferred stock of Gray & Davis, Inc.

Fisher Withdraws from Two Enterprises.

Carl G. Fisher, president of the Fisher-Gibson Co., of Indianapolis, Ind., one of the largest retail concerns in that State, has disposed of his interests and wholly retired from its affairs. The control has passed to Charles Sommers, of Indianapolis, who will succeed to the presidency; A. Waldheim, who becomes vice-president, and David May, of Cincinnati, secretary. Cecil E. Gibson, Fisher's old partner, will remain treasurer and general manager. The newcomers are the same men who joined with Gibson in the recent purchase and reorganization of the Empire Automobile Co. and who renewed the manufacture of the Empire car. Fisher, who is the big man in the Prest-O-Lite Co. and the Indianapolis Speedway, has withdrawn also from the movement to bring the embryo Edwards Motor Car Co. to Indianapolis, for which purpose Toledo parties are conferring with Messrs. Edwards and Stoddard in New York.

TIRE PRICES AGAIN INCLINE UPWARD

Belief That More or Less General Revision is at Hand—But Only One Maker's Figures Are Known.

Reports that an increase in the price of tires is impending have been flying thick and fast during the past two days and, despite several denials, the belief prevails that a more or less general revision of the prevailing figures will come to pass.

To date, however, the Fisk Rubber Co. is the only manufacturer that is positively known to have decided to raise prices; and in that instance the increase is general only so far as it relates to inner tubes and affects only trade prices and not the catalog listings. The only casings affected are those up to 3 inches, which will be advanced 10 per cent. on April 10th. On the same day, the price of Fisk-Dunlop tubes will be raised 15 per cent. and all other tubes 10 per cent. As 3-inch casings are only used on the lighter cars, particularly on the Ford, no very considerable number of car manufacturers will be affected.

At the New York offices of the United States Tire Co., Diamond Rubber Co. and B. F. Goodrich Co., it is positively denied that an advance in tire prices is contemplated.

Two Suits for Windshield Infringement.

Charging infringement of its patent No. 1,011,892, issued to one Martin L. Williams on December 12, 1911, and covering an improvement in windshields for automobiles, the Twentieth Century Motor Car & Supply Co., of South Bend, Ind., last week filed suits in the New York and Connecticut districts of the Federal courts. The suit which was begun in the United States District Court for the Southern District of New York is directed against the Ideal Windshield Co., Inc., of 1926 Broadway, New York City, while the Connecticut action names the Holcomb Co., of New Haven, as defendant.

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GOODRICH'S NEW CAPITALIZATION

How the $45,000,000 Will Be Apportioned Under New Charter—Sales of "Melon" Restricted for Six Months.

Having been ratified by the stockholders, and the "melon" having been made ready for cutting, the legal details necessary to consummate the transfer of the B. F. Goodrich Co. from Akron, Ohio, whose capital is $20,000,000, to the new company of the same name, capitalized at $45,000,000 under the laws of New York, are now well in hand. The transfer will be as of April 1st and conveys the entire Goodrich property, assets, business and good will, to the new company, excepting only certain sums which, according to agreement, are to be retained by the Ohio corporation to pay dividends and other obligations. The controlling interest in the latter company, however, will retain control of the new company and the present management will remain unchanged.

Among other things, the charter of the New York company will provide that until the holders of two-thirds in interest of each class of stock shall otherwise direct, the new company shall pay such taxes in the State of Ohio as may be required to render its stock exempt from taxation in that State.

The capital of the new corporation, as already has been stated in the Motor World, will be divided into 450,000 shares of $100 each, of which 150,000 shares will be 7 per cent. cumulative preferred stock, and 300,000 common stock. At least 3 per cent. of the preferred stock will be retired each year after July 1, 1913, from the net surplus profits of the new company. Dividends may be paid on the common stock, but none of the stock of the new company received by the Goodrich company of Ohio or its stockholders shall be sold, distributed or otherwise disposed of during the sixmonth period from the time of delivery of the stock to the bankers, except with the consent of the latter.

These bankers, Goldman, Sachs & Co. and Lehman Bros., of New York, and Kleinwort, Sons & Co., of London, have acquired 78,000 shares of the new preferred stock and 30,000 shares of the new common stock—par value, $10,800,000—paying therefor $7,800,000, and receiving also an amount equal to the accrued dividends from April 1, 1912, on these 78,000 shares of preferred. The bankers have agreed also to purchase all or such part of an additional 66,667 shares of the new company, at $67.50 per share, as the present Goodrich company may elect to sell. The three stockholders who were parties to the agreement have reserved on behalf of all holders of the present common stock desiring to join therein, the right to purchase from the bankers all or any part of 28,000 shares of the new preferred stock at par value and accrued dividends thereon from April 1, 1912.

The transfer of the corporate existence of the Goodrich company from Ohio to New York entails, as the entire trade knows, the cutting of one of the most uncommonly luscious "melons" which recently has ripened in the industrial field. The holders of preferred stock in the old company are given the option of $120 per share in cash or 1.2 shares of the new preferred issue, while the holders of the old common stock will receive 2.7 shares of the common stock and $78 in cash for each share of the present common stock which they may hold.

Simms Property Basis for Two Dickers.

Although it is known that a representative of the Bosch Magneto Co. has inspected the plant of the Simms Magneto Co., at Bloomfield, N. J., with a view of purchasing all or some part of it, reports that the purchase had been effected are authoritatively denied by Manager Stiefel, of the Simms company. He admits that negotiations of some sort were in progress but absolutely refuses to say what is their nature. The Bosch people also assume the same attitude. According to other reports, the Eisemann Magneto Co. also is dickering for either the Simms factory building or machinery, but Manager Leblanc, of the Eisemann company, denies that such is the case, which denial, however, caused an expression of explosive surprise when it was repeated to other interested parties. The Simms plant in Bloomfield was not completed until late last year and really never has been in full operation, one obstacle after another having served to delay its productiveness. The factory has been at practically a complete standstill for several months and the future of the company a matter for speculation, which, however, shortly will be settled.

To Make Sheet Metal Parts in Indianapolis.

Sheet metal parts, guards, hoods, tanks, underpans, running boards, tool boxes, etc., are to be manufactured by the Scheidel-Thompson Mfg. Co., which just has been organized in Indianapolis, and which has leased quarters in the Industrial Building in that city. Actual operations, however, will not begin until about June 1st. The officers of the company, which is capitalized at $50,000, are George I. Scheillig, president; Bert E. Thompson, vice-president and general manager; R. F. Scheidel, secretary and treasurer, and George H. Scott, superintendent. Thompson formerly was factory manager for the Hayes Mfg. Co., of Detroit, and Scheidel and Scott, superintendent and assistant superintendent, respectively, of the same company. Messrs. Hayes and Emmons, of the Hayes company, were in Indianapolis a few days since, visiting Thompson, but it is stated that there is no Hayes money whatsoever in the Indianapolis enterprise.

OVERLAND RECOVERS TRADE MARK

Former Canadian Agent Who Pre-empted It is Put to Rout—His Overland Company Also Evaporates.

George R. Rastall, who, having pre-empted the Overland trade mark in Canada, induced himself to believe that he was the Overland Automobile Co. of Canada, Ltd., has discovered that he is something else; and meanwhile the Willys-Overland Co., of Toledo, Ohio, has recovered the right to use its trade mark in the Dominion, and Rastall, it is understood, has left that country.

When, in January last, John N. Willys became cognizant of the state of affairs created by Rastall, who at one time was the Overland agent in Regina, Sask., he at once took vigorous action, as was then reported in the Motor World. He instituted suit in the Exchequer Court asking for damages, and the immediate result was that Rastall and his partner changed the name of their company to the Canadian Motors and surrendered to the government the trade mark "Overland," which finally was issued to the Willys-Overland Co. last week.

Meanwhile Rastall had been arrested on a charge of embezzling the funds of his company and his present whereabouts are unknown. The suit for damages, accordingly, will not be pressed, and as one of Rastall's former partners, F. R Mahoney, has the Overland agency in Regina and is doing a good business, he will be left unembarrassed.

When Rastall incorporated the Overland Automobile Co. of Canada, Ltd., he declared that it was in pursuance of an agreement entered into between himself and Willys, and for the purpose of assembling Overland cars in Canada. He alleged that Willys had agreed to take one-half of the $500,000 capital stock of the company, which, he added, "is fully organized and doing business and is controlled absolutely by myself," and having quietly registered the trade mark "Overland" he stated his purpose to commence the manufacture of Overland cars in Canada in the very near future.

Willys denied every statement made by Rastall and legal action followed his denial, with the result that Rastall soon was discomfited and placed in an embarrassing position. The legal proceedings resulted, as stated, in the evaporation of the Overland Automobile Co. of Canada, Ltd., and the recovery by Willys of his right to the trade mark "Overland."

To Make Motor Trucks in Maine.

The Wade & Dutton Motor Car Co., of Lewiston, Me., is about to engage in the manufacture of trucks in that city. For the purpose it has secured manufacturing facilities on Park street.

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FEBRUARY EXPORTS ARE DOUBLED

Month's Total, $2,620,454, Established a New High Mark—Great Gains Made in All Save Two Countries.

January's new high record in the exportation of American-made automobiles and parts—$2,427,891—was surpassed by the second month of this year, when a total of $2,620,454 worth of cars and parts was shipped abroad, as against $1,289,888 worth exported in the same month of 1911, representing a gain of $1,330,566, or 105 per cent. Of this total sum, $2,274,489 was the declared value of 2,403 cars, as compared with 1,023 cars, valued at $1,075,670, sent abroad in the corresponding month of 1911. The remainder, $345,965, of course, represented the value of parts, as against $214,218 in the same month of the preceding year. The average value of the exported cars, however, dropped from $1,051 in February, 1911, to $946 in February, 1912.

Were it not for the small losses registered by Germany and Italy, aggregating less than $9,000, the February figures would have the unique distinction of showing gains in every one of the twelve geagrophical divisions enumerated in the government statistics. Even France and the West Indies, which for several months had shown decreasing purchases, disclose decided gains, taking $39,221 and $42,433 worth of cars alone, as compared with $28,242 and $40,793 worth of cars and parts together, respectively. Canada, by increasing its purchases from $670,090 to $774,270, again attained the lead which it had lost in January, 1912. Great Britain, in second place, took $534,398 worth of cars alone, as against $150,142 worth of cars and parts in February, 1911—a gain of fully 260 per cent. British Oceania, also, showed heavy gains, its purchases amounting to $334,831 in February last, as against $101,728 in the same month of 1911—an increase of 219 per cent.

The figures for the eight months ending February, 1912, reflect the extraordinary gains made in the first two months of this year, no less than 12,347 complete cars having been shipped abroad, as compared with 5,840 cars in the same period of the preceding year, showing a gain of 111 per cent. in the number of cars and 75 per cent. in their value. Parts valued at $2,426,264 were shipped, bringing the total of cars and parts to $14,490,647—a gain of over $6,000,000 over the $8,198,234 in the corresponding period of the preceding year. The table in detail is shown below.

Big Gains in Gas Engine Exports.

According to the government export statistics for the month of February, no less than 954 complete gasolene automobile motors were shipped abroad, valued at $113,871. During the eight months ending February, 1912, 3,484 complete motors, valued at $417,318, were sold to other countries, the figures showing that more than one-fourth of the total for the eight months' period were shipped in the last month, indicating a rapid increase in this trade. No comparative figures for previous years are available, as the statistics did not include motors separately until July, 1911.

Tire Exports Continue to Increase.

During the month of February, 1912, the exportation of American tires again increased substantially, attaining a total value of $267,036, as compared with $179,047 in the same month of 1911, a gain of more than 45 per cent. During the eight months ending February, 1912, $1,641,373 worth of tires were shipped abroad, as against $1,194,720 worth in the same period of the preceding year, an increase of almost 37 per cent.

Michigan Men Distributing Their Stock.

The 21 citizens of Grand Rapids, Mich., who subscribed $5,000 each to induce the Decatur Motor Car Co. to remove from Decatur, Ind., to Grand Rapids, Mich., where the business was reorganized under the title Grand Rapids Motor Truck Co., have formed an underwriting syndicate and now are offering the shares of the truck company to the public. They are giving one share of common stock with each purchase of preferred, which latter is of $100 par value.

STUDEBAKER IN ANNUAL SESSION

Big Corporation Re-elects Officers and Discloses Its Financial Condition—Profits, $2,691,000; Surplus, $944,832.

Practically no change was made in the official make-up of the Studebaker Corporation of South Bend, Ind., and Detroit, Mich., at its annual meeting, which occurred at its legal office in Jersey City, N. J., on Monday last, 1st inst. Philip Lehman, of Lehman Bros., bankers, succeeded Paul Sachs, of Goldman, Sachs & Co., as a director, and James Newton Gunn replaced F. K. Parks, who found it advisable to resign in January last, and the directors in turn re-elected all of the former officers save Parks, who had served as one of the several vice-presidents; he was succeeded by George M. Studebaker. Walter E. Flanders was among those retained in office, the full slate of officials being as follows: J. M. Studebaker, chairman of the board; Frederick S. Fish, president; Clement Studebaker, Jr., first vice-president; George M. Studebaker, vice-president; Walter E. Flanders. vice-president; A. R. Erskine, treasurer; Scott Brown, secretary and general counsel; James Newton Gunn, general manager.

Directors—Frederick P. Delafield, Frederick S. Fish, Walter E. Flanders, Henry Goldman, James Newton Gunn, A. Barton Hepburn, William R. Innis, Philip Lehman, Clement Studebaker, Jr., George M. Studebaker, J. M. Studebaker, John R. Turner.

The annual report of the company was rendered by Clement Studebaker, Jr., first vice-president. The financial statement for the year ended December 31st, which accompanied it, showed profits amounting to $2,691,847.94, which, after paying dividends of $708,750 and charging off extraordinary expenses of $396,478.99, left a surplus of $944,832.04.

According to Vice-President Studebaker, the results in volume of sales and profits from the automobile division of the corporation are much larger than ever before.

The discontinuance of the manufacture

	February				Eight months ending February					
	1911		1912		1910		1911		1912	
	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.
Automobiles	1,023	$1,075,670	2,403	$2,274,489	3,429	$4,566,274	5,840	$6,920,892	12,347	$12,064,383
Exported to—										
United Kingdom		150,142	664	534,398		1,210,921		1,327,767	3,768	2,988,146
France		28,242	43	39,221		349,415		274,788	243	219,734
Germany		12,738	16	10,088		113,469		171,205	89	66,651
Italy		19,764	13	13,500		106,854		101,691	96	72,173
Other Europe		51,699	106	81,714		148,042		399,497	572	485,175
Canada		670,090	747	774,270		1,985,601		3,106,045	2,704	3,249,338
Mexico		34,772	33	44,737		366,681		484,480	236	359,972
West Indies and Bermuda		40,793	29	42,433		315,408		281,977	195	214,113
South America		107,880	143	211,183		205,358		519,847	1,050	1,273,040
British Oceania		101,728	428	334,831		282,508		821,786	2,536	2,253,547
Asia and other Oceania		53,013	119	119,185		192,232		528,649	611	634,284
Other countries		19,027	62	68,929		98,395		180,502	247	248,210
Parts of (except tires)		214,218		345,965		808,610		1,277,342		2,426,264
Total		$1,289,888		$2,620,454		$5,374,884		$8,198,234		$14,490,647

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and sale of electric vehicles and the higher priced gasolene cars and two-speed medium priced cars, and restricting production to the two popular priced cars which now are being marketed, and the resultant liquidation of the departments concerned, "proved to be unexpectedly costly," to quote Mr. Studebaker. "But the move," he added, "was a wise one and the results will be apparent in the future." He also stated that in view of the large trading profits for the year it was deemed advisable that large sums immediately be written off and a satisfactory reserve created against these and other exceptional expenses and losses.

The Studebaker output of automobiles for the year 1912 will be by far the largest in the company's history, and Mr. Studebaker states that it is expected that the entire production will be marketed without trouble.

The financial condition of the corporation is shown in detail by the accompanying tables, which, of course, do not take account of the recent note issue of $8,000,000 which was created since December 31st and therefore does not enter the financial affairs of the corporation for the fiscal year 1911.

R. P. Henderson Defers His Statement.

R. P. Henderson, who is to become president of the Henderson Motor Car Co., of Indianapolis, when it is organized, and which will make a popular price car bearing his name, did not issue the official statement which was promised for Friday last and which it was expected would shed more light on the new enterprise in which he is to engage. He now states that it will be a month or more before he will be in position to make a definite statement. On Friday, however, Charles P. Henderson, president and general manager of the Henderson Motor Sales Co. gave out a statement confirming the reports concerning the Henderson-Cole affairs which were published in last week's Motor World. It emphasizes that when the Henderson Motor Sales Co. goes out of existence on July 1st next, R. P. Henderson will be practically the only member of its working organization who will not join the Cole Motor Car Co., which will practically absorb the Henderson Motor Sales Co., and thereafter will not merely manufacture its own cars, but actually market them.

Jeffery-DeWitt Takes Visible Plug.

The Jeffery-DeWitt Co., of Detroit, has acquired the patents, trade mark and all other rights and title to the visible spark plug heretofore marketed by the Visible Spark Plug Co., of that city. The plug hereafter will be included in the better known productions of the Jeffery-DeWitt line. The distinctive feature of the visible plug, from which it takes its name, is an opening on either side through which the spark can be seen, thereby rendering it possible to observe the sparking of the plug without removing it from the engine.

STUDEBAKER CORPORATION'S ANNUAL FINANCIAL STATEMENT

Profit and Loss Account

For the Year Ending December 31st, 1911.

Profit from Manufacturing and Trading, including operations of Subsidiary Companies		$2,691,847.94
Add:		
Income from Investments, including proportion of earnings of E. M. F. Co. of Canada, Ltd., added to the Surplus of that Company		85,528.32
Interest received		27,560.97
		$2,804,937.23
Deduct:		
Officers' Salaries	$111,499.88	
Reserve for Depreciation of Plant	159,395.70	
		270,895.58
Net Earnings		$2,534,041.65
Deduct Also:		
Interest Charges		483,980.62
Balance being Profit for Year 1911, carried to Profit and Loss Appropriation Account		$2,050,061.03

Profit and Loss Appropriation Account

For the Year Ending December 31st, 1911.

Balance from Profit and Loss Account brought down		$2,050,061.03
Deduct:		
Preferred Dividends Paid:	$708,750.00	
Extraordinary Expenses charged off	396,478.99	
		1,105,228.99
Balance carried to Surplus		$944,832.04

Consolidated Balance Sheet

December 31st, 1911.

Assets.

Trade Name, Goodwill, Patent Rights, etc		$19,807,276.64
Real Estate, Buildings, Machinery and Equipment at South Bend, Indiana, Detroit, Pontiac and Port Huron, Michigan; and at the various Branches of the Company.		
Balance at January 1st, 1911	$9,811,990.34	
Additions during year, less realizations	644,885.89	
	$10,456,876.23	
Reserve for Depreciation since January 1st, 1911	159,395.70	
		10,297,480.53
Foreign Trade Marks		4,892.50
Treasury Stock:		
Common Stock, including amount received in adjustment of consideration paid for properties at time of organization, to equalize variation in inventories	$2,068,400.00	
Preferred Stock acquired towards Amortization Fund, at cost	231,521.37	
		2,299,921.37
Investments in Other Companies		1,199,640.41
Inventories of Raw Materials, Work in Process, Finished Products and Stores, etc., at Factories and Branches		14,391,250.99
Accounts and Notes Receivable and Sundry Debtors		5,688,661.02
Insurance Unexpired, Interest Prepaid and other Payments in Advance		263,308.18
Deferred Charges to Operations		361,829.28
Suspense Account, Flanders Replacement, proportion carried forward		489,448.03
Cash in Banks, on hand and in transit		1,672,434.45
		$56,476,143.40

Liabilities.

Capital Stock		
7% Cumulative Preferred Stock		
Authorized 150,000 Shares of $100 each	$15,000,000.00	
Whereof issued		$13,500,000.00
Common Stock:		
Authorized and issued, 300,000 Shares of $100 each		30,000,000.00
		$43,500,000.00
Minority Stockholders' Interests in Capital Stocks of Subsidiary Companies		28,300.00
Notes Payable		10,050,000.00
Drafts Discounted		318,312.81
Deposits received on Contracts for Sales of Automobiles		321,296.94
Accounts Payable		1,044,623.74
Sundry Reserves		268,777.87
Surplus		944,832.04
		$56,476,143.40

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THE WEEK'S INCORPORATIONS




Detroit, Mich.—Triplex Tire Co., under Michigan laws, with $150,000 capital; to manufacture automobile tires.

Loudsborg, Kan.—Great Eagle Motor Devices Co., under Kansas laws, with $130,000 capital; to manufacture automobile appliances.

Chattanooga, Tenn.—Citizens Automobile Co., under Tennessee laws, with $15,000 capital; to deal in automobiles and accessories.

Beaver Dam, Wis.—Beaver Dam Automobile Co., under Wisconsin laws; to deal in automobiles. Corporators—J. G. Beck, Alvin Beck, Rudolph Beck.

Portland, Me.—C. A. Scott Co., under Maine laws, with $10,000 capital; to deal in automobiles. Corporators—Hugh Lawless, Charles A. Scott and others.

Los Angeles, Cal.—Automobile Flagman Co., under California laws, with $100,000 capital. Corporators—E. C. Reynolds, H. E. King, H. F. Webster and others.

Council Bluffs, Iowa—Twin City Auto Co., under Iowa laws, with $25,000 capital; to deal in automobiles. Corporators—S. V. Bernhart, J. J. Kline,, M. C. Goodwin.

Chicago, Ill.—Downtown Garage Co., under Illinois laws, with $4,000 capital; to operate a garage. Corporators—J. Carlton Abbott, Ralph W. Olmstead, W. B. Atkins.

Augusta, Me.—Omaha Motor Co., under Maine laws, with $1,000,000 capital; to manufacture and deal in motors. Corporators—R. S. Buzzell, E. J. Pike and others.

Boston, Mass.—Picardie Woven Fabric Co., under Massachusetts laws, with $100,000 capital. Corporators—Merrill Griswold, Henry Endicott, Jr., Robert J. Richardson.

Boston, Mass.—Chauffeurs' Legal Association, under Massachusetts laws, with $10,000 capital. Corporators—Jay R. Benton, George A. Kearsley. Francis D. Harrigan.

Jersey City, N. J.—Atlantic Vehicle Co., under New Jersey laws, with $340,000 capital; to deal in all kinds of vehicles. Corporators—M. Black, L. R. Jillson, J. R. Turner.

Boston, Mass.—Williams Auto Co., under Massachusetts laws, with $2,500 capital; to deal in automobiles. Corporators—William T. Hanley, James F. Hanley, Frederick W. Ryan.

Indianapolis, Ind.—J. I. Case Co., under Indiana laws, with $5,000 capital; to deal in motor tractors, etc. Corporators—J. I. Case, R. J. Case, H. M. Walter, all of Racine, Wis.

Boston, Mass.—Auto Sales Co., under Massachusetts laws, with $25,000 capital; to deal in automobiles. Corporators—Leroy P. Russell, Eugene J. Courtney, Louis H. Melzan.

Evansville, Ind.—Victor Automobile Co., under Indiana laws, with $8,000 capital; to deal in automobiles. Corporators—P. B. Fellwock, W. E. Fellwock, J. F. Fellwock, H. F. Nolte.

Eau Claire, Wis.—Eau Claire Vulcanizing Co., under Wisconsin laws, with $2,000 capital; to do a general tire repair business. Corporators—F. E. Hall, E. L. Moffett, B. F. Headley.

East Orange, N. J.—Aymar & Bradley Co., under New Jersey laws, with $50,000 capital; to deal in motor cars, etc. Corporators—H. H. Picking, C. O. Geyer, F. E. Ruggles.

Boston, Mass.—Alpena Boston Co., under Massachusetts laws, with $10,000 capital; to deal in motor cars. Corporators—Charles C. B. Merrill, Claron A. Cook, Peter Begory.

San Diego, Cal.—Auto Service Co., under California laws, with $50,000 capital; to operate a general automobile business. Corporators—E. B. Harvey, W. U. Smith, A. J. Morganstern.

Chicago, Ill.—Economy Garage Co., under Illinois laws, with $2,500 capital; to operate a garage and deal in motor cars. Corporators—John C. Eastman, Lester L. Jones, W. Frank Dunn.

Boston, Mass.—Tank o' Gas Co., under Massachusetts laws, with $200,000 capital. Corporators—Lewis H. Josselyn, Edward S. Everett, Charles E. Osgood, George H. Davis, Theodore M. Josselyn.

Edgewater, N. J.—Steinbock Engineering Co., under New Jersey laws, with $1,000,000 capital; to manufacture automobiles. Corporators—E. J. Forhan, F. B. Knowlton, J. McLaren, all of New York City.

Newark, N. J.—North Jersey Auto Supply Co., under New Jersey laws, with $80,000 capital; to conduct a general automobile business. Corporators—M. Permission, C. G. Butler, E. C. Mehroff, F. W. Mead.

Brockton, Mass.—Kelley-Damon Auto Supply Co., under Massachusetts laws, with $25,000 capital; to deal in motor cars and supplies. Corporators—George E. Damon, Stephen H. Kelley, George F. Damon.

Chicago, Ill.—Chicago Electric Motor Car Co.. under Illinois laws, with $110,000 capital, to manufacture automobiles and accessories. Corporators—David F. Rosenthal, Leo S. Kositchek, J. L. Cossman.

Worcester, Mass.—Worcester Auto Parts Co., under Massachusetts laws, with $10,000 capital; to manufacture automobile parts and sundries. Corporators—James N. Heald, Cyrus N. Cowan, John A. Doane.

New York, N. Y.—Foster Appliances and Specialties Co., under New York laws, with $30,000 capital; to manufacture patented articles. Corporators—E. F. Wood, W. J. Foster, J. A. Hodge, all of New York City.

New York, N. Y.—Havers-Imperial Auto Sales Co., under New York laws, with $25,000 capital; to deal in motor cars. Corporators—Milton Mayer, James McBrien and John F. Barrett, all of 52 William street.

Brooklyn, N. Y.—Ocean Hill Garage, Inc., with $1,000 capital; to operate a public garage. Corporators—Harold Umansky, 151 Christopher avenue; Samuel Umansky and Joseph Umansky, both of 26 Thatford avenue.

Hammond, Ind.—Frederick L. Heintz, Inc., under Indiana laws, with $100,000 capital; to manufacture automobile tires, etc. Corporators—L. M. Heintz, F. L. Heintz, J. G. Vanderveer, Louis Connaghan, Conrad Fischer.

San Francisco, Cal.—Pacific Motor Fire Apparatus and Supply Co., under California laws, with $25,000 capital; to deal in motor fire apparatus. Corporators—H. L. Hudson, C. L. Daggett, Wm. F. McKannay and others.

New York, N. Y.—Washington Square Taxicab Co., under New York laws, with $5,000 capital; to operate taxicabs. Corporators—Lorenzo A. Cuneo, William E. Podesta and Frederick Cuneo, all of 12 East Eighth street.

Buffalo, N. W.—Buffalo Electric Vehicle Co., under New York laws, with $1,000,000 capital; to manufacture electric vehicles. Corporators—William J. P. Seipp, William C. Feuchter and Thomas R. Wheeler, all of Buffalo.

New York, N. Y.—Mayer Auto Specialties Co., under New York laws, with $15,000 capital; to deal in automobile supplies. Corporators—Simon G. Mayer, Albert L. Kull, both of 1731 Broadway, and James McBrien, 52 William street.

New York, N. Y.—Parker J. Manning Auto Co., Inc., under New York laws, with $500 capital; to deal in automobiles. Corporators—Parker J. Manning and Ellen E. Manning, both of 447 East 135th street, and Isaac Levison, 309 Broadway.

New York, N. Y.—Detroiter Company of New York, under New York laws, with $5,000 capital; to deal in motor cars. Corporators—Herbert G. Outwater, 425 West 160th street; Andrew Walz and Jacob Walz, both of 504 West 111th street.

New York, N. Y.—Standard Auto Rent-

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ing Co., under New York laws, with $10,000 capital; to rent automobiles. Corporators—David C. Goodman, 157 East 73d street; William Machol, 11 Broadway; Edwin B. Koenig, 1190 Madison avenue.

New York, N. Y.—Market Auto Garage Co., under New York laws, with $1,000 capital; to operate a public garage. Corporators—Patrizio Garofalo, 2161 First avenue; John Sivigila, East 108th street; James M. Vincent, 145 East 11th street.

Cincinnati, Ohio—Price Hill Auto and Garage Co., under Ohio laws, with $1,000 capital; to deal in automobiles and supplies and operate a garage. Corporators—John Radel, Michael Wolfer, Stephen Radel, William J. Wirmel and John F. Ruehlman.

New York, N. Y.—Auto Mechanical Devices Co., under New York laws, with $10,00 capital; to manufacture all kinds of automobile devices. Corporators—Louis H. Smith, John Sommor, both of 55 John street, and Henry G. Ingersoll, 13 Park Row.

Grand Rapids, Mich.—Commercial Service Truck Co., under Michigan laws, yith $175,000 capital; to manufacture commercial motor vehicles. Corporators—Phillip Moran, J. W. Landeann, G. H. Greenbauer, Sybrant Wesselius, Henry Brink and J. H. Hagen.

New York, N. Y.—O. E. Short & Co., under New York laws, with $25,000 capital; to manufacture and deal in motors, motor cars, etc. Corporators—Orville H. Short, 15 West 91st street; Harlan W. Short, Morsemere, N. J.; H. L. Starr, 1208 Clay avenue.

Amesbury, Mass.—Gray & Davis, Inc., under Massachusetts laws, with $1,250,000 capital; to manufacture automobile accessories, etc. Corporators—William Gray, Alexander Churchward, David B. Kerr, William B. Moses, D. Henry Elkins, William H. Gray.

Springfield, Mass.—Springfield Crude Oil Engine Co., under Massachusetts laws, with $500,000 capital; to manufacture internal combustion motors. Corporators—William F. Miller, Howard R. Bemus, Silas L. Kenyon, Samuel D. Sherwood, Leon J. Hurley, Harry C. Ellis.

Augusta, Me.—Jackson Petroleum Motor Co., under Maine laws, with $500,00 capital; to manufacture internal combustion motors. Corporators—Joseph Williamson, Ernest L. McLean, M. D. Yeaton, Samuel Titcomb, R. S. Buzzell, E. J. Pike, W. E. Dudley, E. A. Hussey and others.

New York, N. Y.—Standard Resilient Wheel Co., under New York laws, with $500,000 capital; to manufacture a patent automobile wheel. Corporators—Joseph Gaynor, 551 Fourth avenue; Philip B. Verplanck, 2122 Fifth street, and Solomon Jochelson, 457 Grand street, New York.

Increases of Capital Stock.

Detroit, Mich.—Invincible Starter Co., to $25,000.

Changes Among Prominent Tradesmen.

Fred L. Morgan, formerly with the Baker Motor Vehicle Co., of Cleveland, Ohio, has joined the staff of the Standard Electric Car Co., of Jackson, Mich. He will act as a special representative.

M. O. Crawford, formerly manager of the advertising and service department of the Colby Motor Co., Mason City, Iowa, has become connected with the Zenith Carburetter Co., of Detroit.

A. M. Laycock, former chief engineer for the A. O. Smith Co., of Milwaukee, has been appointed chief engineer of the automobile axle department of the Sheldon Axle Co., of Wilkes-Barre, Pa. Before joining the Smith company Laycock had been employed in the engineering departments of the English Dailmler company.

Charles Measure, former manager of the Goodyear branch in New York, has been appointed manager of the motor truck tire department of the Federal Rubber Mfg. Co., of Milwaukee. Measure, who is one of the veterans of the tire trade, was identified with Morgan & Wright for 11 years before joining the Goodyear staff in 1906.

Floyd A. Allen, assistant general manager of the Buick Motor Co., Flint, Mich., has been appointed treasurer of the Michigan Motor Castings Co., of that city, both companies being General Motors' possessions. The appointment does not alter Allen's relations with the Buick company, as it is merely in the line of adding to his duties.

In order to facilitate the work, L. A. McKay, who served as Western sales manager for the Franklin Automobile Co., with offices in the factory at Syracuse, N. Y., has been transferred to Minneapolis, Minn., where he has established headquarters. He will handle the Franklin business in nine of the surrounding States, and also in the Canadian provinces of Manitoba and Saskatchewan.

O. R. Hardwell, formerly with the Charles H. Fuller advertising agency, has been appointed advertising manager for the Paige-Detroit Motor Car Co., of Detroit. Hardwell has had experience in the automobile field, having once served as advertising manager of the Canada Cycle and Motor Co., maker of the Russell car, the first in America to employ a Knight sleeve-valve engine.

L. E. Bissell has been appointed manager for the F. B. Stearns Co.'s Atlanta (Ga.) branch to fill the vacancy caused by the transfer of John F. Toole to the management of the Stearns company's Pacific Coast branch in San Francisco. Bissell is well acquainted with the Southern territory, having represented the Peerless Motor Car Co. for several years in that part of the country.

F. E. Howell, special representative of the Diamond Rubber Co.'s truck tire department, has resigned that post to become district manager of the Chase Motor Truck Co., of Syracuse. He will make his headquarters in Philadelphia. Ray Lindsley, heretofore identified with the Denniston truck interests in Buffalo, also has joined the Chase staff and will be associated with the Chase branch in Buffalo.

J. C. Slager, sales manager for the Apple Electric Co., Dayton, Ohio, has been promoted to the post of assistant manager. His elevation has resulted in the calling of F. G. W. Sudrow from the management of the Apple branch in Detroit to the sales management at headquarters, while the vacancy in Detroit has been filled by the appointment of H. J. Shire, formerly with the Roller-Smith Co. The branch also has been removed from 1005 Woodward avenue to 1310 Majestic building.

Woman Heads the New Van Company.

The Van Motor Car Co., which was formed about two years ago in Grand Haven, Mich., to build a low-priced runabout but which got into difficulties before it built very many of them, has been purchased by H. M. Pierce, J. A. Owen and Mrs. L. M. Strong, of Grand Rapids, Mich., who are the owners of the Wealthy Heights Garage, in that city. Mrs. Strong is president of the new company and thereby takes rank as the first woman to occupy such a position in the automobile industry. Pierce is vice-president and Owen is secretary and treasurer. The company purposes to continue the manufacture of what was the Van runabout but which hereafter will be called the Pioneer roadster, and which will list at $750.

Motor Trucks Agitating the Davenporters.

The East Davenport Machine Shop, of Davenport, Iowa, has embarked in the manufacture of motor trucks. Two trial vehicles are now in course of construction and the extent of future production depends somewhat on the result of the work which they perform. Apart from this enterprise the Davenport Commercial Club is engaged in an effort to form a truck company in that city. A Chicago man is spurring on the club with assurances that he can obtain $65,000 or $70,000 for the venture.

Cole to Locate Branch in Detroit.

The Cole Motor Car Co., of Indianapolis, has executed a lease for the building now in course of erection at the corner of Willis and Woodward avenues, in Detroit, which will be maintained as a Cole branch in that city. The building will be 40x75 feet, and will have large show windows on both avenues.

Gets Great Slice of Motz Territory.

The Standard Tire and Rubber Co., 104-106 Portland street, Boston, Mass, has acquired the Motz tire agency for all of the New England States. The Standard company already is well established and thoroughly familiar with its territory.

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August Gruss has purchased the garage of John Becker in Scotland, S. D.

Peter & Son are building a garage and repair shop in Long Prairie, Minn.

Milford, N. H., now boasts of another garage. Edward J. Hopkins just has opened it.

Orval McDonald has leased the Proehl building in Mapleton, Minn., and opened a garage therein.

Klemish & Dickelman is the style of a new firm which has opened a garage at Kewaunee, Wis.

Oscar Wagner is preparing to build a 341 Trumbull street, Hartford, Conn. He has the agency for Oakland cars.

The Kokomo Auto and Machine Co., Cole agent at Kokomo, Ind., has changed its name to C. F. Seaward & Son.

Alan Roxborough and William F. Sanderson have formed a partnership and opened a repair shop and garage at 2120 West Pico street, Los Angeles, Cal.

L. C. Buxton, one of the veterans of the Pacific Coast trade, has opened a salesroom at 1226 South Olive street, Los Angeles, Cal., where he will show Moon cars.

Saunders & Cole, who conducted a garage in Bryan, Tex., under the style Imperial Garage, have dissolved partnership. Saunders will continue the business alone.

Holmes & Howe is the style of a new firm which has been organized to handle the Stearns-Knight car in Kansas City, Kan. Its salesrooms are at 3330 Main street.

Arthur Foraker and Victor N. Cushman have formed the Potomac Motor Car Co. and established salesrooms at 1218 Connecticut avenue, Washington, D. C. They will handle Marmon cars.

The name of the Day-Rice Automobile Co., New Orleans, La., has been changed to Day Autumobile Co., Rice having retired from the company. His entire interest was purchased by Mrs. B. H. Day.

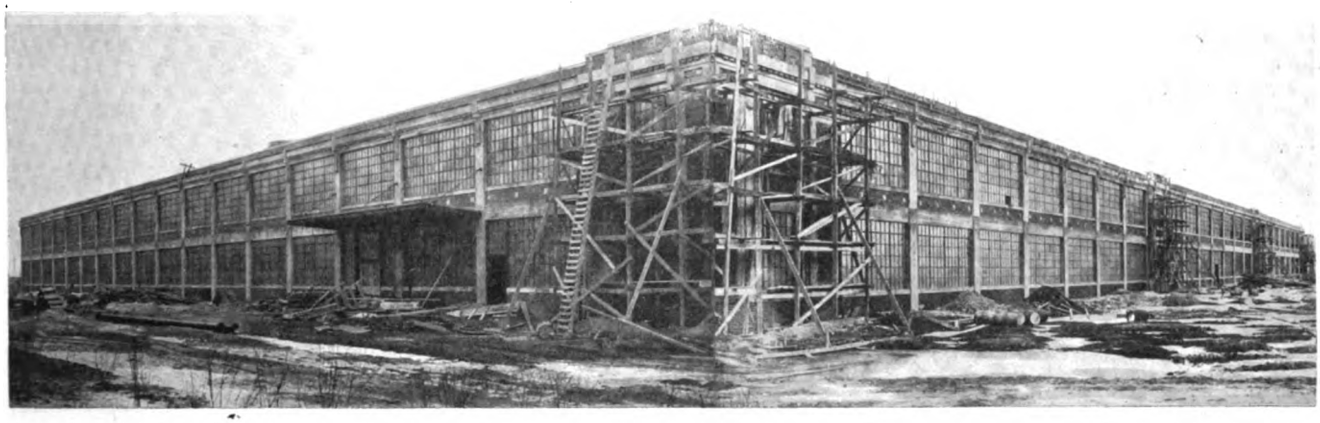
Elwin S. Carll and M. G. Morse, of Waterboro, Maine, have bought the business of the Ford Auto Co., on Mechanic street, Sanford, Maine. They will continue to operate it under the old style.

Bert J. Werber is preparing to open a salesroom and service station at 1109 Pine street, St. Louis, Mo. He has the agency for Poss trucks, and will do business under the style Poss Motor Truck Agency.

The Imperial Automobile Co. has been formed in Cleveland, Ohio, with headquarters at 2025 Euclid avenue, to handle the Imperial line of cars. M. M. Eiseman and Edward McCart constitute the company.

The Des Moines Rambler Co. has been organized by Earl H. Scrippe and J. Givin garage and repair shop on Pearl street,

MAMMOTH PLANT IN WHICH CONTINENTAL MOTORS WILL BE MADE IN DETROIT



The picture shows only one corner of the immense building; several other structures are behind it. Factory covers 12 acres and contains 240,000 square feet of floor space. Annual capacity, 18,000 to 20,000 motors.

William E. McNaught and Oscar Rosenwinkel are preparing to establish a garage in Norwood, Mass.

H. Rea Selby has opened salesrooms in Portsmouth, Ohio. He will handle the American line of cars.

M. C. Tork and H. W. Waddington have purchased the garage formerly operated by Evans & Detens, Highlands, Cal.

J. B. Baldy, Jr., has organized the United Motor Co. in Tacoma, Wash. He will handle Stevens-Duryea, Maxwell, Brush and Cole cars.

Lane Beard has opened a garage in the Belville building, on Center street, Augusta, Ill. He will do business as the Auto Inn Garage.

E. W. Fuller has added automobiles to his livery stable on Court street, Dallas, Ore. He has the agency for several popular-priced cars.

James Morton, of Midland, Md., has purchased the blacksmith shop of H. Gantt, in Frostburg, in the same State, and converted it into a garage.

Port Alleghany, Pa. It is to be 40 feet square, of concrete blocks.

Annum Clay, one of the partners in the Remick & Clay Co., accessory dealers in Sacramento, Cal., has sold his interest to William Appleton. The name of the company has been changed to Remick-Appleton Co.

A new company to represent Kline cars has been organized in Philadelphia, Pa., with salesrooms at 514-516 N. Broad street. It will be styled the Kline Kar Sales Co., and will be incharge of L. E. French and W. Wayne Davis.

Amos R. Bliss, of Lowell, Mass., has opened salesrooms in the Ashwell Garage, Chase, with salesrooms at 916 West Walnut street, Des Moines, Iowa. As the name indicates, Rambler cars will form the mainstay of the company.

Len Ormsby and J. F. Mulqueen, both of whom have earned fame as racing men and who are well knodn to trade in the metropolis, have formed the Blitzen Sales Co. to handle the Blitzen engine starter

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and also to deal in automobiles and accessories generally. They have located at 1777 Broadway, New York.

The Kelly-Damon Auto Supply Co. has been formed at Brocton, Mass., for the purpose of conducting an accessories and supplies business. George E. and George F. Damon and Stephen H. Kelly are the men concerned in the enterprise.

The E. S. Sporting Goods and Auto Supply Co. is the style of a new concern which just has opened up at the corner of Clayton and Lumpkin streets, Athens, Ga. L. E. Scott and W. S. Eberhardt are the partners, whose initials form the name of the company.

Ray H. Reid and Lee Hall have formed the Southern Motor Car Co. and established headquarters at 425 West Forsyth street, Jacksonville, Fla. They will do general garage and repair business and expect later to take the agency for several low priced cars

The W. B. Guyton Tire & Rubber Co. has been organized in Los Angeles to handle Swinehart tires in Southern California and has located at 1013 South Main street. Huber Rasher is president of the cimpany, W. B. Guyton, vice-president and treasurer, and R. V. Terry, secretary.

Christian Science last week gave way to automobile repairing in Wausau, Wis., when T. H. Jacobs purchased the Christian Science church in that town and converted it into a garage. The structure is a typical brick church, tower and all, and Jacobs expects the nover sight to bring him a lot of trade.

John W. Swan has taken the agency for Reo cars in San Francisco, Cal., and established offices in the Reo building on Fulton street, near Van Ness avenue. The retail sales of Reo cars formerly were handled in San Francisco by the Reo Pacific Co., which retains the coast distributing and wholesale end of the business.

Alleging that Otto Goetz, of Iowa City, Iowa, sold him a half interest in the former's automobile business for $2,500 when that half interest was worth only $950, Adam Scheetz, of the same town, has filed suit against Goetz for $1,500 damages. Until recently Goetz and Scheetz operated a garage and salesroom in Iowa City.

Edmund B. Aymar and Harold H. Bradley, both of Montclair, N. J., have formed a partnership and opened temporary salesrooms at 237 Halsey street, Newark, N. J., where they will show Stearns-Knight cars. A permanent home for the firm now is in course of construction at 299-307 Central avenue, and will be ready on May 1.

Recent Losses by Fire.

East Orange, N. J.—John J. Meyer's garage, 494 Main street, and one car destroyed.

Brooklyn, N. Y.—Joseph Michael's garage at Smith and Warren streets destroyed; loss, $25,000.

SUES BANKRUPT FOR COMMISSIONS

Demotcar Sales Co. Loses First Round but Appeals—Terms of the Contract That is Involved.

Involving a claim for $22,789, the suit of the Demotcar Sales Co., of Detroit, against the bankrupt Demotcar Co. just has been decided by the United States District Court for the Eastern District of Michigan, at Detroit, in favor of the bankrupt. The claimants, however, are not satisfied, and have carried the case to the United States Circuit Court of Appeals for the Sixth District, which sits in Cincinnati.

The suit is one of the numerous sort involving the payment of commissions, and is somewhat unusual in that it is leveled against a bankrupt concern and involves a contract that appears to have left much unsaid. The contract, entered into in 1909, whereby the Demotcar Sales Co. undertook to market the output of the Demotcar factory, the selling price of its car being fixed at $550, and a deposit of $15 being required from each purchaser, which deposit was paid to the manufacturer. In return for its service, the Sales company was to receive 20 per cent. of the deposits and 20 per cent. of the remainder of the purchase price when it was received by the Demotcar company.

The Sales company actually obtained orders and deposits for more than 3,600 cars, but comparatively few of them had been manufactured when the Demotcar Co. went into bankruptcy in August, 1910. The Sales company promptly filed its claim, which consists of two items, one for $1,568.50 for commissions, representing cars delivered and paid for, which was allowed by the referee in bankruptcy. The other item involves 21,218.50, representing commissions on orders which the Sales company had secured but which had not been filled, was rejected by order of the referee, who pointed out that the contract between the two companies did not require the Demotcar Co. to deliver any car to any purchaser, and that it contained no provision for any breach in any condition of the contract. Despite this apparently convincing argument, the Demotcar Sales Co. applied to the courts and, undiscouraged by its loss of the first round, is still fighting for what it believes is its due.

Bay City Gets Another Truck Factory.

The Wenonah Motor Truck Co. has been organized in Bay City, Mich., and will be incorporated under the laws of that State, probably during next week. A. B. Perkins, a prominent commission man of Bay City, and his three sons, together with G. E. Porter, an experienced automobile man from Detroit, are the men concerned in the enterprise, of which A. B. Perkins will be president, C. R. Perkins, secretary and treasurer, and G. E. Porter, manager and chief engineer. A factory already has been secured in Bay City, at Eleventh and Saginaw streets, which affords 25,000 square feet of floor space, which quarters, however, are of a temporary nature, as the the building of a modern factory is in view.

The company will produce trucks of 1,000, 1,500 and one ton capacity, the first output being of the 1,000 pound type It will employ a four-cylinder unit power plant, sliding gears, thermosiphon cooling, with fan in the flywheel. The 20-horsepower motor will be located under the hood in front. Ignition will be by Bosch high tension magneto with fixed spark. Lubrication will be by splash.

Court Now Hearing Nobby Tread Appeal.

The appeal of Morgan & Wright, of Detroit, Mich, against the decision of Judge Lacombe in the famous "Nobby Tread" suit at present is being argued in the United States Circuit Court of Appeals for the Second Circuit, in New York City. As will be recalled, the Republic Rubber Co., of Youngstown, Ohio, charged Morgan & Wright with infringement of the Tod J. Mell patent, No. 898,907, on staggered treads for automobile tires, and Judge Lacombe last October decided in favor of the Republic company, holding the patent infringed. He granted an injunction but suspended it pending the outcome of the appeal to the higher court.

Sues "Unlicensed" Seller of Spit-Fires.

In line with their action in similar instances of unlicensed sales of their Spit-Fire spark plugs, A. R. Mosler & Co., of New York City, on Friday last, 29th ult., filed suit in the United States District Court for the Southern District of New York against the American Auto Supply Co., of 1697 Broadway, New York, asking for an injunction and accounting. The complaint charges infringement of the Mosler patents, Nos. 698,042 and 738,831, by offering for sale Spit-Fire plugs without a license or permission from the patentee.

Van-L Truck Passes Into New Hands.

The Commercial Service Truck Co., capitalized at $175,000, has been organized in Grand Rapids, Mich., to take over the business of the Van-L Motor Truck Co., which occupies a factory building in that city. The officers of the new company are Philip Moran, president; J. W. Landman, vice-president, and G. H. Greenbauer, secretary. Of the capital stock, $112,000 has been subscribed, and the remainder is offered for sale in order to increase the working funds.

Lewis Departs to the Pacific Coast.

E. W. Lewis, secretary and treasurer of the Timken-Detroit Axle Co., has departed for an extended vacation, which will reach as far South as New Orleans and as far West at Los Angeles. He will be absent about a month or six weeks.

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TEMPERING CLEAN DESIGN WITH ACCESSIBILITY.

It is not inconceivable that in course of time the progress made in the design and construction of automobile motors will have reached such a state of development that it rarely will be necessary to give them much more attention other than the replenishment of oil, fuel and water tanks.

In the present state of the art, however—and things must be dealt with as they are, and not as they may be in the future—motors cannot be so built that they will not require more or less frequent attention, especially in commercial vehicles, and often such attention is entailed at times when facilities for doing the necessary work are limited and time presses. In such cases the motor the parts of which are the most accessible, must win advocates, even though its design may not be the acme of compactness and smoothness. In other words, accessibility is of more importance than mere appearance or compactness, and will continue to be so until motor engineering has reached a considerably higher level than that on which it now stands.

Within the last year or two a great deal of attention has been bestowed upon the production of compact motors of what is termed clean design, and to the reduction of noise. While in many cases remarkably good results have been attained, in some instances there is a distinct tendency to jumble parts together in such a way as to make it a matter of the utmost difficulty to reach those parts that are most likely to require attention. Exhaust and intake manifolds sometimes are so placed as to make the removal of valves a task of magnitude; pumps have been placed so they are difficult to find, to say nothing of removing them for repairs; valve stems and springs have been covered—for the purpose, laudable in itself, of muffling noise—so that it is an unpleasantly difficult matter to uncover them; and so on. Obviously this is not as it should be, and though the objects sought in tucking things away out of reach are intrinsically right, it still is necessary that compactness and clean design should be tempered with accessibility.

ROOM FOR LANDAULET TYPES OF BODY.

Just because the number of cars that were kept in commission during the past cold months was greater than ever before does not necessarily mean that the individual motorist gradually is becoming more immune to the rigors of winter weather on the highway. But it does point conclusively to the fact that the day of "all year" motoring surely is drawing nearer. Which leads to the conclusion that the practice might be fostered by the simple expedient of supplying a type of body that is more suitable for all weather use than are existing types—a body which will provide warmth and protection in winter and protection without warmth in summer.

With all due credit to the wisdom of those who have made the utterances, there really are few if any sound reasons for maligning the landaulet body. It is quite true that the landaulet body is far from perfect. But such bodies and the recently developed convertible bodies, which one minute may be a closed car and the next an open car, as open as all outside, are a step in the right direction and the wonder is that there is not a greater number of them in use. Their cost naturally militates against them for the use of the average motorist of average means, but it appears that there is room for improvement—that a body of this type might be produced at a moderate cost and supplied as "stock" on moderate priced cars. At any rate, the number of such moderate priced convertible cars abroad surely is increasing and there is even more reason why they should increase on this side of the water. Runabouts and touring cars are all right as far as they go, but they do not go far enough, or, at any rate, not comfortably enough, when the chill of winter is in the air or when the floodgates of heaven are opened.

FRELINGHUYSENISM AND THE FRUITS THEREOF.

Conceived in a narrow, grasping spirit, as those intimately familiar with the subject are well aware, it was inevitable that sooner or later the legislative conscience of New Jersey would be quickened and that that State would rid its system of the bile that had been injected into it and again become an integral part of the Union. The Chinese wall which Joseph Frelinghuysen built around the State which he served as a senator while actually living in New York, and which just has been torn down, injured New Jersey and New Jerseymen more than all others. In mere dollars and cents, their loss has been incalculable; in prestige and personal comfort the loss has been even greater. While New Jersey at last is well rid of Frelinghuysenism, more than a generation will be required to overcome the moral effect of what that term stands for; and if it stands for anything it stands for the gross perversion of so-called State rights. This is one country and "reciprocity" between any of the component parts of it should be unnecessary.

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BENNET SOUNDS NOTE OF WARNING

General Motors' Export Manager Points Out Danger of Scramble for Foreign Trade—Fears Overstocked Market.

O. G. Bennet, vice-president of the General Motors Export Co., who just has returned from a European trip, speaks interestingly of the progress made by American manufacturers in exploiting their product in England and other foreign countries, and, while not pessimistic, sounds a note of warning that is worth heeding.

"There has been so much optimistic talk of late in regard to our export trade in motor cars that it is time the conditions as they exist should be known," he says. "It is true that the number of cars shipped from this country is steadily increasing, but analysis of the situation develops that our increased business during the past few months has been done chiefly with England.

"The indifference on the part of the American manufacturer to the English market during the past few years seems to have been supplanted by a wild rush for business in that country. In consequence, the pendulum has swung so far in the other direction that much harm may be done to American trade during the next few months by the overstocking of goods as was ever done by neglect in the past.

"The English market consumes in the neighborhood of 40,000 medium priced cars yearly, so the total number shipped from the United States makes a small percentage. The number of Englishmen who will buy American cars and be willing to have their friends know it is growing constantly, but as far as I have been able to ascertain the number of shipments now taking place are not orders but consignments. In some instances dealers have small deposits on a number of orders, but most of these cars are awaiting purchasers.

"The General Motors business in England is in a very healthy condition. We are selling to our British cousins just what they want. They have their own ideas regarding bodies and finish, and we are willing that they should buy those of English design for application to our chassis, which they find, price considered, far superior to their own make, and it follows that we believe this the proper policy to pursue."

Norwalk Now Seeks Men With Money.

Grown philanthropic, the 35% Automobile Supply Co., of New York, which is practically another name for A. B. Norwalk, is reaching out in a new direction in its get-the-money campaign. Through the medium of conspicuous advertisements in local papers, he is offering a "Big Business Opportunity for the Right Man," the opportunity consisting of a chance for "the right man" to "invest $5,000 or more" in a branch store which Norwalk says he desires to establish "right on the ground with the right man at the head of it." Despite the fact that most men with "$5,000 or more" are inclined to invest it on their own accounts, Norwalk apparently believes there are enough of them anxious to get in touch with him, and for some reason he desires that they address their letters to him personally and not to his company.

Imports Show Renewed Activity.

Imports of automobiles into the United States during the month of February, 1912, for the first time in nearly three years showed increased shipments from each of the four leading automobile manufacturing companies of Europe, the total figures for the month amounting to 73 cars, valued at $166,048, as compared with 41 cars, valued at $104,924, in the same month of the preceding year, representing a gain of 76 per cent. in quantity, and 60 per cent. in the value of the cars. The respective quantities are as follows:

Imported from	No.	Value.	No.	Value.
United Kingdom..	10	$30,158	21	$45,278
France	21	46,813	40	101,696
Germany	1	2,856	4	4,854
Italy	2	4,050	6	9,818
Other countries..	7	21,047	2	4,402
Total cars.....	41	$104,924	73	$166,048
Parts of.....		16,716		29,241
Total cars and parts		$121,640		$195,289

The gains registered during the first two months of 1912 served to boost the figures for the eight months ending February, 1912, above those for the same period of 1911, the records showing that 717 cars, valued at $1,572,376, were received, as compared with 586 cars, valued at $1,250,144, last year. Parts to the value of $212,195 and $212,245, respectively, were imported during these periods, bringing the totals for cars and parts to $1,784,568 in the eight months ending February, 1912, as against $1,462,389 in the same period ending February, 1911.

Clayden "Clocked" for His Courtesies.

Arthur Ludlow Clayden, the member of the British Institution of Automobile Engineers, who attended the meeting of the American Society of Automobile Engineers in Dayton, Ohio, last summer, and who inspired the visit which the S. A. E. party paid to England later in the year, has received tangible evidence that his many courtesies have not lacked appreciation. The members of the S. A. E. who made up the party have purchased by subscription and presented to Clayden a Waltham chronometer which will prove a handsome and useful desk ornament. The case in which the chronometer is enclosed bears a plate suitably inscribed.

Neumann Heads the Detroit Dealers.

William F. Neumann, of the Neumann-Lane Co., was elected president at the annual meeting of the Detroit Automobile Dealers' Association on Monday last, 1st inst. The other officers chosen are as follows: H. B. Moran (Chalmers), vice-president; Joseph A. Schulte (Cadillac), secretary; C. C. Stockweather (Buick), treasurer; Paul R. McKenny (Brush), director. Preceding the election, which occurred at the Log Cabin Inn, dinner was served.



April 6-8, San Antonio, Tex.—San Antonio Automobile Club's reliability run.

April 13, New York City—Annual Motor Truck parade under the auspices of the New York Motor Truck Club.

April 14, San Jose, Cal.—Track races promoted by J. Alex. Sloan.

April 29-May 4, Burlington, Vt.—Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal.—Santa Monica road race.

May 15-18, Chicago, Ill.—Chicago Motor Club's reliability run for commercial vehicles.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H. — Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

S. A. E. to Locate in Rubber Building.

On or about May 1st the New York headquarters of the Society of Automobile Engineers will be removed from their present location, 1451 Broadway, to the new 20-story building of the United States Rubber Co., at Broadway and 58th street, which is nearing completion. The S. A. E. will be located on the 12th floor, and its quarters will be sufficiently ample to permit of salesroom and library, business office, secretary's office and stockroom.

Mott Puts Flint Socialists to Rout.

C. S. Mott, the active manager of the Weston-Mott Co., of Flint, Mich., was elected mayor of that city on Monday last, 1st inst., by a majority of about 1,800. His election was of more than usual interest in that he was opposed by a cigarmaker on the Socialist ticket, who opposed Mott not as an employer of labor but because he was alleged to represent what were termed corporation interests. Mott ran as an independent and carried the entire Citizens' ticket with him.

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SCHIMPF RETAINS CHAIRMANSHIP

Patriotic New Yorker Finally Made Permanent Head of A. A. A. Contest Board—Webb, However, Succeeds Stevens.

William Schimpf, ex-president of the Long Island Automobile Club, of Brooklyn, N. Y., will continue, for patriotism and not for pay, to serve as chairman of the Contest Board of the American Automobile Association, which position he has filled since the death of Samuel A. Butler in November last. Schimpf's first acceptance of the position was only temporary, and there were those who for some reason appeared to fancy that a paid chairman might perform better service, but with that queer notion dissipated and now that Schimpf has been formally installed as the head of the board, it is expected that the reins of power will be drawn still tighter and that in the future contests and the operations of the Contest Board will be conducted in an even more strictly businesslike way than heretofore was the case.

Barring the appointment of Schimpf, only one other change in the personnel of the board was made, Frank G. Webb taking the place of S. B. Stevens, who resigned. The other members remain as follows: H. W. Knights, P. D. Folwell, Joseph H. Wood, Charles I. Ryan, David Beecroft, Frank M. Joyce, R. W. Carr, Ralph W. Smith and P. W. Walker. The Advisory Committee remains unchanged and includes S. A. Miles, manager of the National Association of Automobile Manufacturers; H. A. Bonnell, manager of the Automobile Board of Trade, and Jesse Froehlich, representing the importers.

Similarly, the list of State representatives remains unchanged and is as follows: A. M. Kennedy, Alabama; G. P. Bullard, Arizona; P. J. Walker, Northern California; Edward G. Kuster, Southern California; Ralph W. Smith, Colorado; C. H. Gillette, Connecticut; Henry M. Taylor, Delaware; H. B. Race, Florida; Charles I. Ryan, Georgia; R. W. Spangler, Idaho; David Beecroft, Illinois; C. W. Sedwick, Indiana; C. A. Kneedler, Iowa; P. M. Milner, Louisiana; T. C. Campbell, Louisiana; D. W. Hoegg, Jr., Maine; Dr. H. M. Moore, Maryland; H. W. Knights, Massachusetts; Dr. C. E. Dutton, Minnesota; Robert P. Bridge, Mississippi; W. P. M. Stevens, Missouri; W. D. Hooford, Nebraska; C. M. Floyd, New Hampshire; Joseph H. Wood, New Jersey; Frank C. Webb. New York; James R. Gray, Jr., North Carolina; W. J. Price, North Dakota; Nelson B. Ruggles, Ohio; H. L. Keats, Oregon; P. D. Folwell, Pennsylvania; Charles E. Dee, Rhode Island; A. McP. Hamby, South Carolina; H. C. MacCoshen, South Dakota; R. W. Carr, Texas; W. D. Rishel, Utah; W. W. Brown, Vermont; Dr. H. W. Bassett, Virginia; F. M. Fretwell, Washington; T. A. Westmyer, West Virginia; George A. West, Wisconsin.

As the result of several changes of a financial nature which were made in the agreement which binds the Manufacturers' Contest Association and the A. A. A., the relations between the two bodies have become even more closely interwoven than heretofore, the changes having been made as a result of several conferences between President Hooper and Messrs Joyce and Speare, of the A. A. A., and Messrs. Coffin, Marmon, Hollander, Riker, Wagoner, Meigs and Emise, of the M. C. A. As chairman of a special committee from the M. C. A., E. R. Hollander accepted the revised agreement under which operations will be carried on in the future.

Disbrow's One-Mile "Record" Falls Flat.

According to despatches from San Diego, Cal., Louis Disbrow drove a 190 horsepower reconstructed Fiat on Monday last, 1st inst., one mile in 38⅗ seconds, and thereby established a new record for the distance. But for two very excellent reasons the "record" is no record at all. In the first place, the Contest Board of the American Automobile Association does not recognize one-mile circular dirt track records unless they are actually are made on a one-mile circular dirt track. Disbrow drove on a two-mile track. In the second place, the A. A. A. requires that electric timing apparatus be used in the establishment of all records for distances under five miles. Disbrow was "clocked" with an ordinary stop-watch. Consequently, the record for a one-mile circular dirt track still stands at 48.6 seconds, where Burman set it last September at the Brighton Beach track in New York. That Disbrow drove mighty fast there is no doubt, but the fact remains that he is not entitled to a record, nor will he get one for the trial. The meet in which Disbrow drove was sanctioned, the sanction being issued jointly to J. Alex. Sloan, who but recently was reinstated in the A. A. A.; Louis Disbrow and a local newspaper man.

Orders Chauffeurs to Go to School.

The ordinance of the Berlin authorities demanding a special training for chauffeurs in a municipal chauffeurs' school may or may not have come to the notice of the mayor of Boston. If it has escaped his eye, it would seem to indicate that "great minds run in the same channel," as the old saw goes. For last week the Hub's executive issued orders to all department heads employing chauffers to request the chauffeurs to attend the Franklin Union course upon the operation of gasolene engines, which opened on Monday, April 1st. The mayor believes that every city chauffeur who gets a certificate from the Franklin Union should be given an increase in salary, and plainly intimated that unless the chauffeurs took advantage of the course their requests for more pay would not be considered. The course will extend for eight weeks, with three classes weekly.

NEW JERSEY'S WALL DEMOLISHED

Despite Protests, Governor Signs Reciprocity Bill—Exact Text of Law as it Applies to Non-Residents.

Governor Wilson, of New Jersey, attached his signature to the Stickel automobile reciprocity bill on Tuesday last, 2d inst., and thereby, for the first time in five years, that State once more became a land of and for the free. The law took effect immediately, and non-resident motorists, without distinction, now can come and go as they please and without cost for a period of fifteen days in each year. Even the objectionable "power of attorney" clause, by which non-residents automatically appointed New Jersey's secretary of state as their attorney or agent to accept legal service, has been eliminated.

The opponents of the measure died hard. They maintained their objections to the very end, appearing before Governor Wilson at a hearing which he held Tuesday afternoon and voicing more or less indignation and fear, all of which was of the same sort that "Carpetbagger" Frelinghuysen, who was responsible for the miserable law that closed the State, and his kind have brought to bear whenever it was sought to break down the bars which they erected. One of them, described as a farmer, voiced the attitude of the opposition when he declared that New Jersey was giving away everything and receiving nothing in return. When Governor Wilson reminded him that the bill gave to other States just what was given to New Jersey, the farmer raised a laugh when he retorted:

"Well, Governor, if New York permits us to injure and kill its citizens, is that any reason why we should permit citizens of other States to kill and injure ours?"

The automobile interests also were well represented and brought their heavy oral artillery to bear. When the hearing was over the governor promptly signed the bill, thereby making it a law

Assemblyman Stickel, who stood sponsor for the bill, is the youngest member of the legislature, and it is probable that he shortly will be tendered a banquet at which he will be presented the pen which Governor Wilson used in signing the measure. As a matter of fact, the overjoyed automobilists not only secured the pen, but one of them handed the governor a blotter, and, after the executive had used it to dry his signature, tucked it into his pocket and remarked that he intended to frame it as a souvenir of a five-year fight for fair play.

While it gives freedom to non-residents, the law increases the registration fees of New Jerseymen 50 per cent., the new charges being $4.50 for vehicles of less than 10 horsepower; $7.50 for those of from 11 to 29 horsepower, and $15 for those of 30

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horsepower and over. The full text of those sections of the law which contain the reciprocal features is as follows:

"Any motor vehicle belonging to any person who is a non-resident of this State and who has registered such motor vehicle in and has complied with all the laws of the State, Territory or Federal district of the United States in which he resides with respect to the registration of motor vehicles and the display of registrations numbers, and who shall conspicuously display such registration number as required thereby, may be driven in this State during a period of not exceeding 15 days in each calendar year, or on two or more occasions not exceeding in the aggregate the period of 15 days in any such year, without complying with or being subject to, the provisions of sections 15 and 21 of the act to which this is a supplement; provided, that each day or part of a day during which any such motor vehicle is within this State shall be considered as one of said 15 days; and provided further, that the provisions of this section shall be operative as to any such motor vehicle owned by non-resident of this State only to the extent that under the laws of the State, Territory or Federal district of his residence, substantially similar exemptions and privileges are granted to motor vehicles duly registered under the laws of this State.

"Any chauffeur or driver of a motor vehicle not a resident of this State, who has registered under and complied with all the laws respecting the registration and licensing of chauffeurs or drivers of motor vehicles in the State, Territory or Federal district in which he resides, may, during the period mentioned, and under the restrictions contained in the preceding section of this supplement, drive any such motor vehicle in this State without complying with, or being subject to, the provisions of sections 17 and 18 of the act of which this is a supplement, or any of them; provided, that the provisions of this section shall be operative only to the extent that under the laws of the State, Territory or Federal district in which such chauffeur or driver resides substantially similar exemptions and privileges are granted to chauffeurs or drivers of motor vehicles registered under the laws of this State."

"Keep to the Left" in Canal Zone.

According to an executive order of the United States government, the speed limit for automobiles in the Panama Canal zone has been fixed at 15 miles per hour. Simultaneously with establishing rules governing the speed of automobiles it has been decided to follow the English custom of "keep to the left" instead of to the right, as in the United States and most of continental Europe. Vehicles approaching each other or being overtaken and passed by other conveyances, are required to keep as closely as possible to the left of the road, while those overtaking and passing other vehicles must pass to the right.

MASSACHUSETTS TO RAISE FEES

Increases Advocated by Governor Are Approved by Legislative Committee—Rates for Heavy Trucks Arouse Protest.

Believing that the present fees for automobiles and other motor vehicles are not high enough to compensate for the damage done to highways, the Committee on Roads and Bridges of the Massachusetts legislature has reported in favor of the increase recommended by the governor. If the bill having this change in view goes through, the motorists of Massachusetts will have to pay the following fees: 5-19 horsepower, $4.80; 20-29 horsepower, $11.60; 30-39 horsepower, $19.50; 40-49 horsepower, $36.75, and more than 50 horsepower, $50.

The bill also provides for an increase from $2 to $2.50 in the motorcycle fee, from 50 cents to $1 in the operator's renewal license fee and from $25 to $30 in the manufacturers' and dealers' registration, with $6 instead of $5 for each additional car registered beyond five.

While the opposition to the proposed increase for pleasure cars is not inconsiderable, it is as nothing compared to the hue and cry that is being raised by the commercial vehicle users over the unfairness of the classification. They particularly cite the case of the heavy trucks.

"For example," says Lewis R. Speare, of the Massachusetts State Automobile Association, "some five-ton trucks have 35 horsepower, some have 40 and some 48.6. Each is carrying the same load and at the same rate of speed. Manufacturers agree that 12 miles an hour is the speed that a truck should make, and it should not be driven at a higher rate. If the 48.6 horsepower truck was rated at 49 the fee would be $36.75, the 40 horsepower would pay $30, and the 35 horsepower would pay only $17.50, less than half the registration of the 48.6 truck, while doing equal damage to the road in every respect.

"In other words, the 48.6 horsepower motor truck is obliged to pay more than twice as much as the 35 horsepower truck simply and purely because it has a larger engine. It goes no faster, carries no larger load, and does no more damage to the road.

"We have suggested the following scale for motor trucks, which would make an enormous increase in the amount of registration, and, it seems to us, would be fair: 1-ton, $5; 2-ton, $7.50; 3-ton, $10; 4-ton, $12.50; 5-ton, $15; 6-ton, $17.50; 7-ton, $20; 8-ton, $22.50; 9-ton, $25; 10-ton, $27.50; over 10-ton, $50."

Milwaukee and Dallas Want the Vanderbilt.

Following closely the definite announcement that the Vanderbilt Cup race would not be held in Savannah, Ga., two applications from organizations which are anxious to stage the classic event in their respective localities have been filed with the A. A. A. Dallas, Texas, already had entered its bid, and quite unexpectedly the Milwaukee Automobile Dealers Association, with the endorsement of the Milwaukee Automobile Club, the Chamber of Commerce and the Hotel Dealers' Association, submitted a proposal to conduct not only the Vanderbilt race, but the Grand Prize race, on one of three courses near the city. Each of the three courses in view is about seven miles in extent, and it is claimed by the Association members that the expenditure of about $50,000 would suffice to put either of them in first-class condition and also to erect the necessary grandstands. The Dallas (Tex.) Automobile Club would run the cup race on a course which measures 11 3/10 miles, and which is located at no great distance from the city.

No More Racing at Minnesota Fair.

Though no fatalities nor even accidents marked the two days of automobile racing which added zest to the Minnesota State Fair last year, it is not at all unlikely that the "automobile racing card" will be eliminated from the program when the "event which will make Minneapolis famous" is inaugurated during the week September 2d to 7th. According to officials of the Minnesota Agricultural Society, under the auspices of which the event is held annually, as a certain amount of danger always is attendant upon race meets which are run on dirt tracks, it is deemed wise not to again include speed contests in the program. This is the fifth State fair association which has tabooed automobile racing, Syracuse, N,. Y. Minneapolis, Minn., Spokane, Wash., and Dallas, Tex., having reached similar decisions within recent months.

Anti-Automobile Bills Die with Legislature.

When the New York legislature adjourned on Friday last, all of the several bills inimical to the automobile interests died with it. Among those that expired were the bills requiring the dating of tires, the display of an automatic rear signalling device and the one which proposed the abolishment of automobile racing in New York State. The Callan law was left untouched and unamended. Of the bills favored by the automobile interestes, there was enacted in the closing hours of the legislature one which seeks to provide an additional $50,000,000 for road improvement.

A. A. A. Tour Will End in New Orleans.

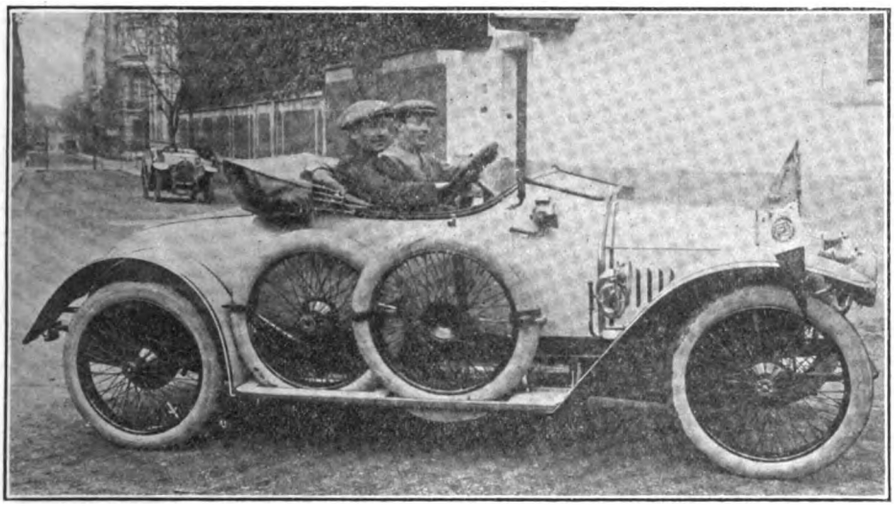
It has definitely been decided that the A. A. A. reliability tour heretofore known as the Glidden tour will terminate in New Orleans, the $4,500 guarantee necessary to bring about the selection of the Crescent City having been pledged by members of the New Orleans Automobile Association. The starting point has not yet been selected, but several cities, Detroit in particular, are bidding for the honor.

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TOUR DE FRANCE PROVED A JOY RIDE

Fine Roads and Easy Conditions Enable 40 Contenders to Survive—Benz Team Wins — Americans Eliminated.

Although the newspaper-promoted Tour de France, which started from Paris on March 1 and finished in a Paris suburb on March 20 last, after having covered about 2,400 miles of the class of roads for which France is famous, was called a reliability tour, it should have been labeled "joy ride" —for aside from a few minor requirements as to speed limit and classification according to size of cylinders and gear ratio, it was a free-and-easy sort of a run. Which, in a way accounts for the fact that 40 out of the original 67 entrants were able to go the whole route without serious mechanical trouble. The 27 "missing" were not all eliminated by accidents or engine trouble—in several instances being simply ruled "out" by the "racing jury" for infraction of the few regulations that had been formulated.



ONE OF THE BENZ TEAM IN THE TOUR DE FRANCE

The first prize, consisting of a superb art plaque presented by the City of Lyons, went to the Benz team. In awarding this prize L'Auto, which promoted the affair, says: "The performance of this team was a revelation to all; for 4,000 kilometers these silent, powerful and speedy cars never were more than 50 yards apart; they were always on time, had no mechanical troubles of any kind and were voted the most beautiful cars of the whole 67." Medals of gold and silver went to the Corre, Bugatti and the Dumond, which latter was the only single-cylinder four-cycle machine in the contest.

Had it not been for a somewhat strict application of the restrictions as to gear ratio, the three Ford entries would have appeared among the finishers instead of being disqualified, for despite their early disqualification, as reported in the Motor World, they continued as non-contestants. French reports of the disqualification differ in details, but according to the most reliable version of the affair the Ford cars, in negotiating an extremely hilly section of the tour, changed the 32-inch demountable wheels to 30-inch wheels, thereby obtaining a more advantageous gear ratio for hill-climbing. When this change of wheels was called to the attention of the racing jury by a number of the contenders, the latter's protest was sustained and the Ford team was disqualified. As stated above, it finished in good shape with the rest of the cars, though, of course, as non-contenders.

As the organizer of the tour, L'Auto, put it: "The Fords were eliminated on account of an error of judgment on the drivers' part —not because they did not do their work well."

The other American contenders, two Reos and one Hupmobile, were pursued by bad luck, suffering minor mishaps which put them out of the running by delaying their arrival at control stations.

Oldfield's Sentence Suddenly Shortened.

For no apparent reason other than mellowness of spirit, the ban which was placed on Barney (Berna) Oldfield by the Contest Board of the American Automobile Association about two years ago and which would have expired by limitation on July 1st next has been commuted and after April 30th, which is the date set for his reinstatement in good order, he will be able to drive in sanctioned meets without contaminating those with whom he may compete. The disqualification of Ben Kerscher, who was one of Berna's helpers and whose sentence likewise would have expired on July 1st, also was commuted to terminate April 30th, though "Bill" Pickens, Oldfield's one-time manager, did not get off so easily. From an indefinite period his disqualification was definitely fixed to expire on July 1, 1917, by which time it is thought his heels will be well cooled.

NEW YORK TO ELIMINATE CUT-OUT

Aldermen Finally Pass the Prohibiting Ordinance — Will Become Effective 90 Days After Mayor Approves It.

On and after a date which will fall somewhere near the glorious and noisy Fourth, there will be less noise in New York than now is the case, if, as seems probable, Mayor Gaynor affixes his signature to the ordinance forbidding the most unnecessary of street noises, that caused by the muffler cut-outs, which was passed by the Board of Aldermen at its last meeting, on Tuesday, April 2d. The measure, which was introduced by John H. Boschen, becomes operative 90 days after receiving the mayor's signature; the mayor is allowed 10 days in which to append his name.

Briefly, the ordinance provides that every motor shall be equipped with a muffler or silencer through which all the exhaust gases must pass, and prohibits the use of a muffler cut-out or any device that will permit the exhaust gases to escape into the asmosphere without first passing through the muffler. Violations are to be punishable by fine or imprisonment, the minimum being $10 or 10 days.

In this connection it is not generally known that some four years ago a measure of similar import to the one just passed was drafted and handed to Alderman Mulcahey, who at that time represented the district which Boschen now represents, and who professed to be enthusiastically in favor of it. It was quietly pigeonholed, however, and when pressed for the reason for his inaction Mulcahey threw the blame on the aldermanic law committee, which, he stated, declared the proposed ordinance to be illegal and prevented its introduction.

The text of the Boschen measure is as follows:

"Section 1. Every motor vehicle propelled by an internal combustion engine, when such vehicle is on any street, road, avenue, alley, park, parkway or public place within the city limits, shall, when such engine is running, be equipped with a muffler or silencer, through which all or the exhaust gases from the engine will escape into the atmosphere.

"Section 2. It shall be unlawful for the operator or driver of any motor vehicle to use any cut-out, fitting or other apparatus, or a device which will allow the exhaust gases to escape into the atmosphere without passing through a suitable muffler or silencer as described in section 1.

"Section 3. Any person violating the provision of this ordinance, may, upon conviction thereof by any city magistrate, be fined a sum not exceeding $10, and, in default of payment of such fine, may be committed to prison by such city magistrate until the same be paid, but such imprisonment shall not exceed 10 days

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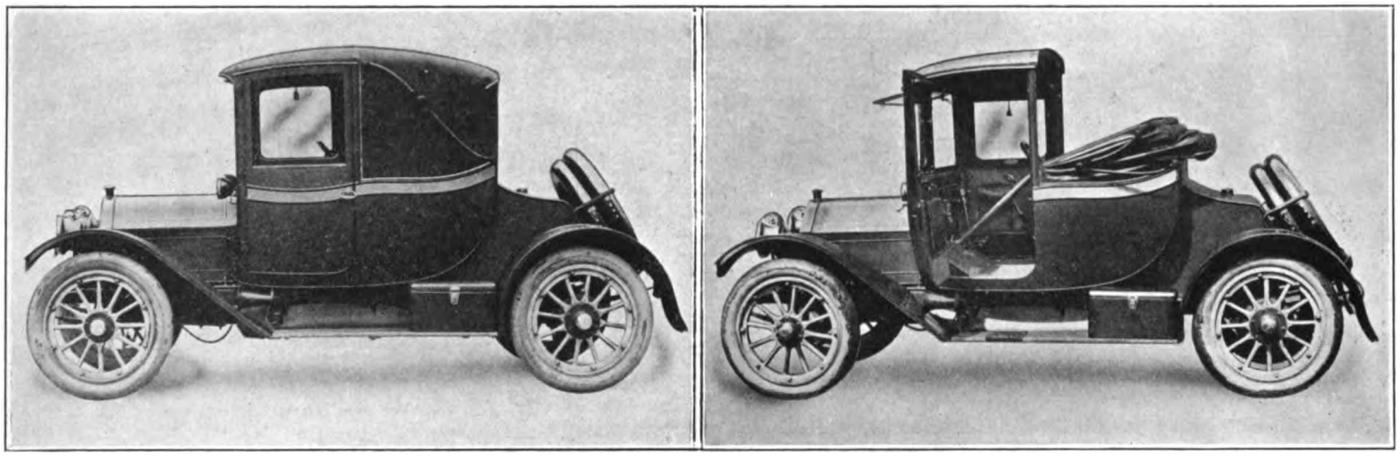
COUPE-LANDAULET BODY APPEARS

Type Much in Vogue Abroad But Seen Here Only in Taxicab Form Finally Finds Sponsor—Its Features.

Though the inside driven coupe which but recently has sprung into prominence fills in a measure the popular demand for an "all weather" type of body, it still leaves something to be desired. When the windows are closed it becomes a closed car in every sense of the word, but when the windows are opened it does not become an open car to the extent that might be desired. The landaulet offers a partial solution of the problem, but there are those to whom the landaulet does not appeal either by reason of its size, which increases upkeep cost, or because the owner cannot drive the car and at the same time be protected from the elements. It is to bridge the gap between the coupe and the landaulet that the R. J. Irvin Mfg. Co., the Indianapolis body maker, has brought out what is styled the Irvin coupe-landaulet, a type of body which is much in vogue abroad and which is shown by the accompanying illustrations.

In perfecting the new body the comfort of passengers has been maintained as of prime importance, as a matter of course, and to this end the upholstery has been given unusual attention with a view to producing the easiest riding qualities possible. In addition to the usual curled hair, the cushions are rendered even softer and more luxurious than usual by the insertion of extra long coil springs. Another feature which is worthy of remark is that the doors have been made unusually wide, the sills measuring 26 inches. The provision of abundant storage space likewise reveals careful designing and forethought. Under the seat, which is 50 inches wide and therefore seats three passengers without undue crowding, there is space sufficient to store two suit cases. The back upholstering of the seat is arranged to swing outward on hinges and discloses a roomy cupboard suitable for the carrying of robes or clothing, which may be hung on hooks, and also spare tubes and tools. Numerous shelves are provided for the reception of small articles, and at each side there are two circular spaces in which Thermos bottles may be carried right side up. Additional storage space is provided at the back of the body in a compartment which also contains a 20-gallon gasolene tank.

Entrance to the compartment is effected by means of a wide door at the back. Spare tires inflated and carried on demountable rims are carried at the rear, over the compartment, and are held in place by means of special tire irons.



IRVIN COUPE-LANDAULET BODY CLOSED AND WITH THE BACK LET DOWN

Municipality Establishes Chauffeur's School.

With the intention of increasing the efficiency of German chauffeurs—in particular that of Berlin chauffeurs—the city of Berlin, Germany, has taken a step which wiwll be watched with the greatest interest by all other large cities of Europe. It is nothing less than the establishment of a municipal school for chauffeurs, in which every person who hereafter applies for a driver's license in Berlin, will be required to pass through a stated training course. As far as equipment is concerned the new institution will be second to none in the world, no less than six of the leading automobile factories of Germany—Benz, Daimler, Adler, Stoewer, N. A. G., and Siemens-Schuckert—having presented new cars to the school, while the Association of Motor Vehicle Manufacturers has given a full line of motors, parts, carburetters, etc.

One New Truck Appears at Geneva Show.

Amid a setting embracing the usual abundance of tinted bunting and glowing electric lights, a comprehensive display of motor vehicles, both pleasure and commercial, was staged in the Geneva (N. Y.) State Armory from Thursday evening, March 28th, until Tuesday, April 2nd. The rather inclement weather which prevailed on the opening night in no wise blighted the size of the crowd which turned out to view the display, which was held under the auspices of the Geneva Automobile Club. Interest attaches to the fact that in this rather conservative array, 21 different makes occupied the booths of the 21 exhibitors, one truck not heretofore exhibited, should appear. It was the Geneva, produced by the Geneva Wagon Co. It is of conventional design, is of 20 horsepower and sells for $1,345. Among the exhibitors were A. V. Hart, Krit and Everitt; Stacey & Jones, Elmore; Geneva Automobile Co., Pierce-Arrow, Buick and American; Auto Sales Co., McIntyre pleasure and commercial; C. O. Hagenbeck, Maxwell; George Goodelle, Reo; H. A. Wagner, Oakland and Rambler; A. McNall, Peerless and Rauch & Lang electric; Abbott-Detroit Sales Co., Abbott-Detroit; Cutting Sales Co., Cutting; E. C. Patterson, Davis; Yells & Schnirel, Overland; A. M. Zimbrich, Stoddard-Dayton and Haynes; Geneva Wagon Co., Geneva commercial.

"Rounding Up" Trucks for the Parade.

As the date approaches for the New York commercial vehicle parade, which has been made a spring fixture by the Motor Truck Club, the members of that organization are bending all their energies to the task of making the showing a representative one and one that will eclipse its previous effort in that direction. The parade takes place on April 13th, starting at 2 P. M., and if the weather gods smile, it cannot well fail to be an improvement on last year's, when a downpour of rain made the turnout a dismal affair.

Nast Assumes "Touring Club" Presidency.

Conde Nast, who recently was elected president of the Class Publishing Co., of New York, has assumed the presidency of the so-called Touring Club of America, which is owned and controlled by the Class Publishing Co. The Touring Club of America is a convenient title which is employed to promote the sale of the road books and road maps issued by an offshoot of the publishing company.

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THE DETERMINATION OF CARBURETTER EFFICIENCY

Lack of Knowledge of True Engine Characteristics That Precludes the Possibility of Making Comparative Tests of Real Value—Peculiarities of Altered Efficiency That Obtain Under Different Running Conditions Revealed by Laboratory Tests.

How often has one person made the assertion that with a particular carburetter gasolene consumption is nothing short of remarkable for its smallness only to be contradicted by some one else having identically the same car and carburetter whose gasolene bills are considerably higher?

Leaving aside the irrefutable fact that gasolene consumption depends to a great extent on the expertness of the operator in adjusting his carburetter and the speed of the car, and considering only the relative efficiency of the carburetter as indicated by the actual amount of gasolene converted into power, that this factor for even the same carburetter may vary over exceedingly wide limits according to the speed of the engine to which it is attached has been definitely determined in a more than ordinarily conclusive manner.

The determination was made in a series of carburetter tests which were made by Messrs. R. W. Noland, G. P. Rettig and J. A. Saurs at the School of Mechanical Engineering of Purdue University, of Lafayette, Ind. The tests form the basis of a paper entitled "Some Tests on Carburetters," which was read before the American Society of Mechanical Engineers and it is doubtful if ever before so much light has been shed on the otherwise dark subject of carburetter efficiency.

Before delving into the significance of the tests, George W. Munroe, who presented the paper, first outlines the problem of carburation for automobile engines and points out the difficulties met in determining the performance of a carburetter as distinct from the performance of the engine to which it is attached. Though his opinions scarcely are new, their reiteration may serve to emphasize the fact he later brings out, namely, that there is real necessity for the maintenance of a testing plant "the constants of which are well determined."

"The peculiar features of the problem are that a carburetter is used only in conjunction with an engine and so properly should be tested upon it, thus introducing engine characteristics into the result," he says. "Again, the engine requires a carburetter for operation, and so its performance cannot be determined free from carburetter factors. From this it appears that the two must be tested together, and the securing of a proper standard for comparison of results is most important.

"As the best performance of the engine marks also the best possible carburetter action, the complete determination of the engine characteristics would establish a basis for comparing the behavior of any carburetter which might be used. Owing, however, to the fact that the charactertis-tics of some carburetters are always superimposed on those of the engine, the limitations due to such purely engine factors as compression, shape of clearance space and friction, cannot readily be determined. However, if an engine were tested under the same running conditions with a large number of carburetters, some one of them might furnish a perfect mixture and the best possible performance of the engine would be realized. The repetition of this process with a large number of running conditions would ultimately result in defining completely the engine performance."

To achieve the results which are given in the accompanying table, six carburetters were tested under identical engine conditions through a range of 10 speeds, from 300 to 1,200 revolutions a minute. The

R.P.M.	300			400			500			600			700			800			900			1000			1100			1200		
Carburetter	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent	Horsepower	Lb. Gasolene per hr.	Efficiency per cent
A	8.138	9.6	10.4	11.122	13.2	10.3	15.429	13.4	14.1	16.276	12.7	15.8	18.688	13.0	17.7	21.678	15.0	17.8	24.602	17.0	17.8	26.688	18.0	18.2	29.357	18.9	19.0	31.80	19.5	20.1
B	8.764	9.0	12.0	12.450	11.7	13.1	14.595	11.8	15.2	18.380	14.5	15.5	21.316	18.6	14.1	25.010	21.3	14.4	26.292	21.9	14.7	28.356	24.0	14.5	31.192	25.2	15.2	32.552	26.1	15.3
C	9.265	9.4	12.1	11.122	12.0	10.4	12.510	13.0	11.8	14.898	12.8	14.3	17.958	15.0	14.7	20.677	15.0	16.9	24.789	16.6	18.3	28.356	17.0	20.5	31.651	17.7	22.0	32.552	18.0	22.2
D	8.380	8.0	12.9	12.450	9.9	15.5	15.870	11.7	16.7	19.530	13.8	17.4	22.776	14.8	18.8	25.010	20.6	15.0	27.012	19.5	17.0	30.441	21.2	17.5	32.109	24.0	16.4	32.552	25.8	15.5
E	8.764	8.0	13.4	12.450	12.6	12.1	15.640	14.0	13.8	18.530	15.0	15.2	21.316	15.0	17.5	24.345	16.1	18.6	27.600	18.6	18.2	30.441	19.4	19.3	32.797	19.8	20.3	34.050	19.2	21.8
F	7.136	6.5	13.5	12.782	10.8	14.5	16.263	13.5	14.8	19.030	15.6	15.0	22.484	18.0	15.4	24.679	18.6	16.3	26.667	18.6	17.6	28.356	19.5	17.9	29.815	22.8	16.0	30.548	22.9	16.4

Efficiency based on assumed fuel value of 20,700 b.t.u. per lb.

TABLE SHOWING THE VARYING EFFICIENCY OF CARBURETTERS AT DIFFERENT ENGINE SPEEDS

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tests were made on a four-cylinder Rutenber engine having a bore and stroke of 4½ inches and 5 inches, respectively, and at each speed tests were run with 10, 20, 30, etc., pounds net load on the brake up to the maximum which could be carried, making some 80 tests with each carburetter.

Though the greater part of the paper is quite technical in its nature and as such perhaps might serve but to bore or confuse the average mind, the accompanying table is a sermon in itself and serves to to indicate conclusively that though one carburetter may show remarkable efficiency —which, as has been pointed out, means the actual value of the fuel divided by the actual power developed—at one engine speed, it may show a woful lack of efficiency at almost any other speed; which leads to the conclusion that the carburetter which will permit an engine to develop the greatest possible power at maximum speed, with comparatively low gasolene consumption may have very much lower efficiency at normal speeds. In other words, it is essential that for economy a carburetter be chosen with due regard to its efficiency at the speed at which the car is to be driven. Barring this, the carburetter which shows the greatest average efficiency at all speeds will be the most economical.

For instance, referring to the accompanying table, carburetters A, B and C show greatest efficiency, which means the least amount of gasolene consumed in pounds (a pound being approximately a pint) per horsepower delivered, at 1,200 revolutions a minute. Carburetter D, however, shows greatest efficiency at 1,000 revolutions per minute, though the greatest power is developed at 1,200 revolutions per minute; the efficiency, however, drops off at the higher speed. Carburetter D, therefore, is the most economical to use at 1,000 revolutions per minute.

Another peculiar fact disclosed by the table is that though carburetter E permits the maximum power obtainable to be realized its efficiency is considerably lower than is that of carburetter C. Similarly, though carburetters C and D give exactly the same maximum power—32.552 horsepower—their efficiencies differ by 6.7 per cent. It is obvious which of the two should be chosen for economy. The average efficiencies of the six carburetters in the order in which they are named in the table are as follows: 16.12 per cent., 14.40 per cent., 15.89 per cent., 16.27 per cent., 17.02 per cent. and 16.42 per cent. Carburetter E, therefore, shows the greatest average efficiency, though at lower speeds the efficiency is very considerably lower than that of some of the others. The average efficiency of all the carburetters, which may be taken as a fair average figure for the efficiency of all carburetters, is 16.20 per cent.

"A consideration of the results obtained," says Monroe, in summing up, "leads to the following conclusions:

"(a) Under identical conditions of speed and load an engine gives materially different fuel economy when served by different carburetters.

"(b) Carburetter action is the limiting factor in engine capacity as well as in economy.

"(c) Wide range and perfect operation give no indication of fuel economy.

"(d) Each carburetter has distinctive performance characteristics which may be determined and plotted.

"(e) The characteristic may be such that a carburetter giving excellent results under some conditions may give very poor economy over a large part of its range.

"Being the limiting element of engine capacity and economy, the carburetter is a machine of great engineering and economic importance and as such demands more scientific methods in its development than have yet been applied. This would necessitate systematic testing and comparison, not only of widely different types, but of the same carburetter after minor changes in design.

"A method of testing carburetters which would be independent of engine characteristics is much to be desired, as then results obtained by different experimenters in different places could be compared. Lacking such a method, it seems desirable that an engine be properly equipped and placed in some laboratory for the testing of carburetters, thus establishing, after the engine characteristics became thoroughly known, a definite standard available for reference. Such a standard would be valuable only in case carburetters retain their relative characteristics when transferred to different engines, which seems probable but has not yet been established experimentally.

"This would require a large expenditure, both for plant and for operation, and, undertaken as a commercial venture, would probably be attended with financial loss. Engine builders, however, spend vast sums each year in developing and perfecting their output, and when the dependence of the engine on the carburetter is considered it would seem that several engine manufacturers might profitably unite in the systematic improvement of the carburetter. Several States have established engineering experiment stations where problems of importance in the development of industries or the conservation of important natural resources may be thoroughly investigated, and the carburetter, important in both aspects, may properly receive their attention."

Bogus Checks Land Canadian in Jail.

With a penchant for inflicting his unwelcome visits upon automobile dealers, Robert McKay Oliver, a young man from Toronto, with a pronounced English drawl, has been making things lively in Buffalo, N. Y. During the past few weeks a number of that city's dealers have been victimized by the distinguished-looking Canadian, whose specialty was the purchase of runabouts and roadsters and paying for them with bogus checks. Not that he succeeded in getting the cars themselves, but on the strength of his deposit of a $500 check "on account" he obtained innumerable "demonstration" rides, during which he stopped at high-class tailoring establishments, where he gave bogus checks for clothing he had ordered and collected the change in real money. His activities finally became so involved and varied that no less than twenty complaints reached the police in a single day, with the result that he was taken into custody and held for trial on charges of attempted grand larceny.

Horns Attuned to Musical Chords.

From a small beginning in a small place, the Minerva exhaust horn has been developed and improved from time to time until the 1912 line comprises a wide range of styles and sizes, all, however, embodying the same fundamental principles and all giving clear musical combinations of notes, varying according to the size and number of pipes employed.

The horn, made by the Minerva Hardware Mfg. Co., of Minerva, Ohio, is of the type which is attached to the exhaust pipe at the discharge end of the muffler. It is made with either three or four pipes, each pipe producing a distinct note of its own, and all perfectly tuned so as to give correct musical chords and requiring so little power that it is claimed that lung pressure will sound them. In fact, the maker goes so far as to state just what notes are produced by given pipes, so that the prospective purchaser can, if he chooses, play the chord on his piano and see if he likes it before buying—and, incidentally, the horns are sold on the "money back" plan. The material used for the pipes is heavy gauge brass tubing and the construction throughout is substantial.

English as it Comes from England.

"We summon from the 'motor house' our new 'two seater' or 'get-a-bout' and watch with some pride as it gracefully draws up to the 'kerb.' It is a 'well sprung' little car and fully equipped with 'vibration absorbers.' Other notable 'fitments' are the friction 'windscreen,' 'hood' (top) and 'bonnet' (hood). Clamped to the left 'step-board' is an extra 'tyre' with anti-skid 'cover.'" They are great on "oddments" in England, as the foregoing description of the latest "8 Guinea Tax" car serves to show. It can do a "flying mile" faster and on less "petrol" than many more costly cars and without opening the "silencer." The car can now be had with detachable "dickey" at a really modest "inclusive" price if purchase is made before date of "expiry" of the offer.

"Economizer" Coming from Poughkeepsie.

The Motor Attachment Co. has been organized in Poughkeepsie, N. Y., by Henry Schrowang, George J. Callahan and Albert Iber, who have in view the manufacture of a gasolene economizer. The company is a partnership and not a corporation.

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FORESHADOWS OF THE FAR-DISTANT FUTURE

Budding Engineer Peers Into the Future and Discerns Several Radical Changes in Automobile Practice That May Come to Pass—Among Other Things He Sees Governors on Pleasure Cars and Injection of Liquid Fuel and Pictures Their Advantages.

"It certainly is remarkable with what rapidity the order of things changes," remarked the Designing Engineer's second assistant, with not a trace of that temerity, or tidimity or modesty he was wont to display when discussion waxed warm.

"How so? What's on your mind now?" queried the man from downstairs.

"Well, just glance over the history of the development of petroleum distillation and notice what was done with the lighter distillates, with the naphthas, the gasolenes, the benzines, at the period just previous to the adaptation of the internal combustion engine to the use of liquid fuel. All of these lighter distillates were more or less of a drug on the market; they were used to some small extent in the arts owing to their solvent properties, but the supply greatly exceeded the demand and the price was exceedingly low even for the rectified products, while the crude products, or those which were not purified by redistillation, were considered as waste by the producers. True, a few of the producers used vast quantities to dilute the first marketable distillate kerosene—but the laws enacted prohibiting the sale of kerosene which was below the flash test limit put more or less of a check on this practice.

"The introduction of the carburetting devices and consequent widening of the scope of application of the internal combustion motor so as to make possible its use in isolated places—that is, in districts remote from the city or town and where gas is not likely to be supplied—had a decided effect on the price of the lighter oils. Then came the introduction of self-propelled vehicles—vehicles using liquid fuel in a regular steam engine or in an internal combustion motor. Motor boats propelled either with a steam engine so modified as to use the vapor of naphtha or gasolene in the cylinders or an internal combustion motor entered the field of the gasolene users at about the same time; the lighter products received another boost in price and the average value has steadily been on the increase ever since. Nowadays the lighter products are diluted with the heavier oils; however, this is not done for purely mercenary reasons, although there is a considerable difference in the price of the two products, and this in favor of the gasolene. The adulteration of the gasolene with the lighter grades of kerosene raises the flash temperature and thus renders the product safer for universal usage.

"The steady and non too gradual increase in the price of the only universally employed liquid fuel ought to set to thinking every person interested in the automobile trade and cause them to guess when the limit will be reached, what the limit will be, what will be used when the supply falls short of the demand. Personally, every time the papers announce an advance in the price of gasolene I indulge in one long sweet dream. At such times I can see the more than one hundred and one ways which are not now taken advantage of for the conservation of the supply of liquid fuel. And among the one hundred and one there are two which always stand out prominently."

"Only two?" queried the man from downstairs, with a trace of irony in his tone which wholly was lost on the designer's assistant, now warmed to his theme.

"Well, very much depends on the driver. In England the price of gasolene is nearly double what it is in America—yes, it is a little more than double at the present time—and yet, unless I am far wrong, it costs little if any more to operate a car in England than it does right here. What's the matter? Why, simple enough: It's the American temperament. British cars are no more perfected in design than are our cars; there is no more refinement in detail over there than is shown in the construction of American cars; their motors show no greater thermal efficiency than do the motors of our native heath, and yet they can go about double the distance on a gallon of gasolene. There are only two reasons that I can see why this should be the case. First, because of the prohibitive tax on the higher powered cars the average English automobile is light and low powered; and, second, the average English car owner prefers to travel at a uniformly moderate pace and does not accelerate the the machine to 60 miles an hour and then retard it to 20 miles the next moment. There is not the slightest doubt that were an American car matched with a car of British manufacture, the cars being of equal weight and power and both provided with careful drivers, the average gasolene consumption per mile would vary but slightly. But the American desire for speed, the American's so-called pride, which will not allow of another car passing him on the road, causes the operating and maintenance costs to mount high. However, the usual run of car owners have the idea that a motor car is an expensive proposition; they think that about the only way to cut down expenses is to avoid being fined for overspeeding, and consequently they slow down every time they see anything that looks like a bluecoat, and imagine that by so doing they are reducing operating expenses."

"Does your dream include always keeping a bluecoat in sight?" tauntingly interrupted the downstairs skeptic.

"Oh, you go to!" retorted the assistant designer. "I'm in earnest; and if you know anything at all you know that about the quickest way to gain the attention of any individual is through the medium of his pocket book. When the price of gasolene or other liquid fuel reaches the stage where the operating costs when the motor is run spasmodically at high speed are greater than the fines, it seems to me not unlikely that the victim of this speed fever will himself call for the antidote.

"What will be the medicine? Well, perhaps there 'ain't none.' That disease probably is incurable. The desire to pass someone else never will be overcome in this country—it's too much a part of our lives. The cure will be worked on the car rather than on the individual, and it seems to me that will be in the form of check rain; a governor. Yes, a small hit and miss or throttle governor which will limit the supply of fuel will do a great deal toward lessening the costs of motoring, and it is not at all improbable that the use of such a device will be just as common with the pleasure cars a few years hence as is the case with the motor trucks to-day, and with every bit as much success."

"Sounds reasonable! But 'come again.' You said you had two economical streaks."

"Yes, but the other is more in the nature of a personal opinion—a pet hobby, so to speak—and—— Oh, well; I'll give it to you, anyway. It is a fact that an internal combustion motor, to be at all economical—or, in other words, to be thermally efficient enough to compete with the steam engine—must compress the charge before firing. It is likewise true that the degree to which the compression is carried has a very decided effect on the thermal efficiency of the machine, but, of course, this is not without limitations. Now, the limit to which the compression of gasolene vapor can be carried before there is a falling off in the efficiency has not yet been reached, for the very simple reason that if the compression is carried much beyond the standard 70 pounds per square inch, considerable loss of power is caused by premature igni-

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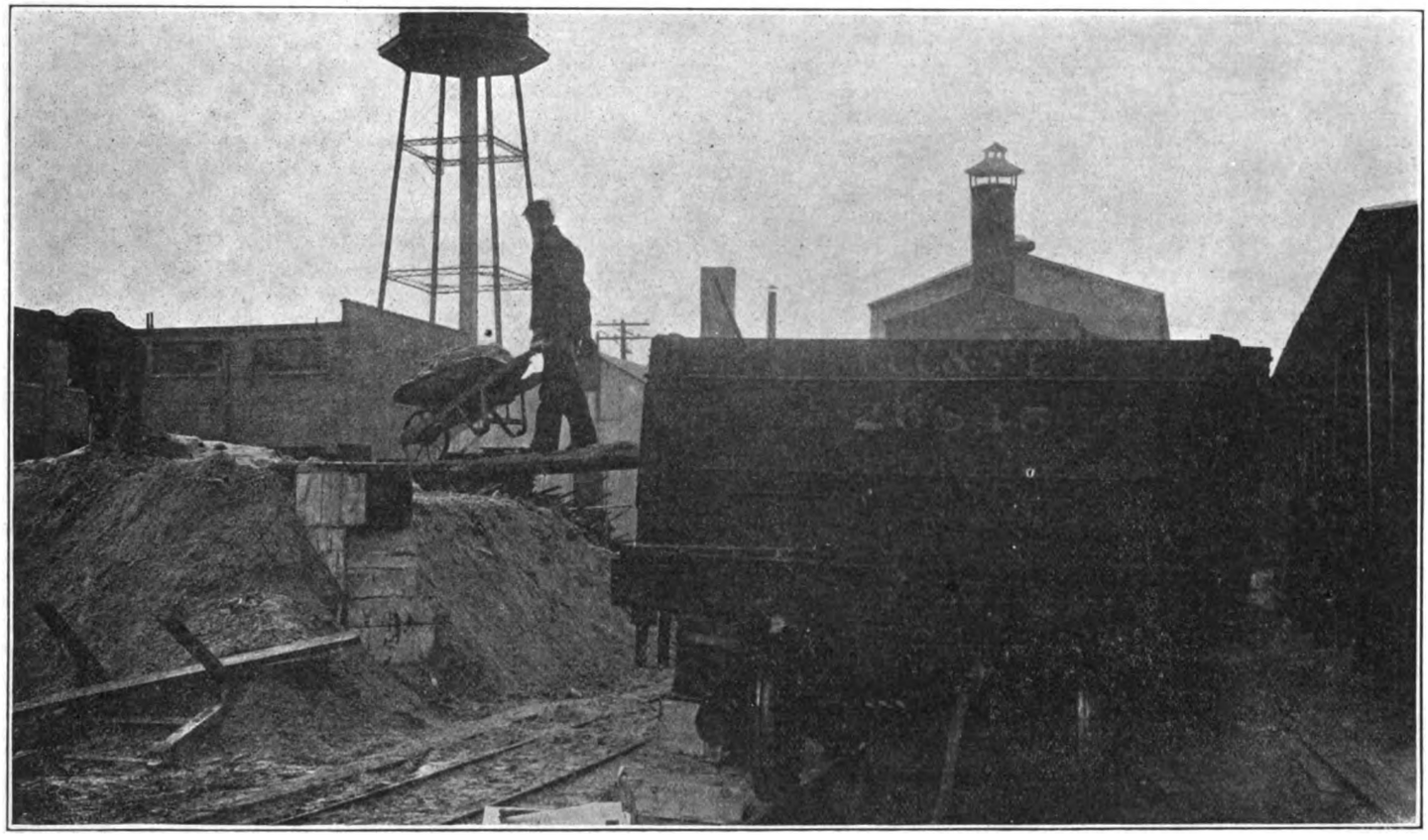
tion. During a series of tests made by the United States government to determine the degree to which compression could be effectively carried using gasolene as a fuel, the fuel was fed through the medium of a carburetter and in order to prevent pre-ignition water was also injected into the cylinder in quantities varying from one-half that of the gasolene until equal with the gasolene. The compression was carried to 130 pounds with no sign of preignition. The thermal efficiency of the motor remained the same throughout these tests as problem resolves itself into the one of elimination of the fuel from the cylinder until the position of the piston precludes the chance of pre-ignition working any negative effect."

"That means liquid injection of the fuel?"

"Yes, and why not?" Among the many other functions which tend to determine the effective power which can be taken from a gasolene engine of a given size, none stands out more prominently than does the cylinder volume. Now, consider the the air in the first case must be supplied. Isn't it perfectly reasonable, then, to expect an increase in power when the fuel is injected as a liquid?"

"Oh, I know that liquid injection isn't new and that the drawback is in the production of a homogeneous mixture, but I fully believe that by properly designing the fuel injection valve and the combustion chamber the mixture can be made to equal the mixture supplied by the present carburetter. The system need not necessarily be more complicated than at present; for a

FACTORY SCENE THAT DOES NOT CONVEY ITS OWN SUGGESTION



Not waste but molding sand being unloaded at R. C. H. plant in Detroit.

it was with the lower compression; the power was neither increased nor decreased, as was also true with the rate of fuel consumption, and this despite the fact that the available cylinder volume was limited and the effective temperatures lowered by the introduction of the water. Doesn't it seem reasonable that with the compression increased without recourse to the injection of water or by any other means which would tend to to have a negative effect a rather large field for the increase of the thermal efficiency of the gasolene motor is thrown open?

"As for the means of preventing pre-ignition, to me it seems rather a simple matter. It is certain that if no explosive mixture exists in the cylinder before the time for regular ignition there will be no early explosion, no pre-ignition, so that the charge which fills this volume; where gasolene is the fuel there are 7.3 volumes of air to each volume of vaporized fuel, which proportion forms theoretically the correct mixture. If the air and the gasolene have been mixed on the outside of the cylinder, one-eighth of the cylinder volume is occurpied with the gasolene vapor. If the fuel is not injected with the air, or, in other words, if the fuel is injected as a liquid, the total cylinder volume is occupied by the air before the introduction of the fuel. It stands to reason that the amount of air in the second case exceeds the first amount by approximately 12 per cent., and as a consequence when the fuel finally is injected at the completion of the compression stroke in order to produce perfect combustion of the mixture an excess of 12 per cent. over the amount taken in with four-cylinder motor but two pumps are necessary, both double-acting and driven by suitable cams; or possibly one single-acting pump would suffice if worked in conjunction with a suitable distributing valve. One thing is certain, however, and that is that the proportion of gasolene vapor mixed with the air could be made constant without the shadow of a doubt simply by varying the stroke of the fuel injection pump as the speed changes, or, in other words, as the throttle is opened. And when we get a car or a truck of that sort, believe me! we will not be using gasolene or carburetters.

"Wow!" was the cruel retort to this final flourish of earnestness. But the exclamation was followed by the well-timed disappearance of the doubter from downstairs.

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THE ARCHED REAR AXLE IN THEORY AND PRACTICE

Dissection of the Principle of the Arch That Tends to Disprove the Accepted Belief That an Arched Axle May Be Stronger Than a Straight One—Why the Straight Axle, Weight for Weight, May Sustain the Same Loads.

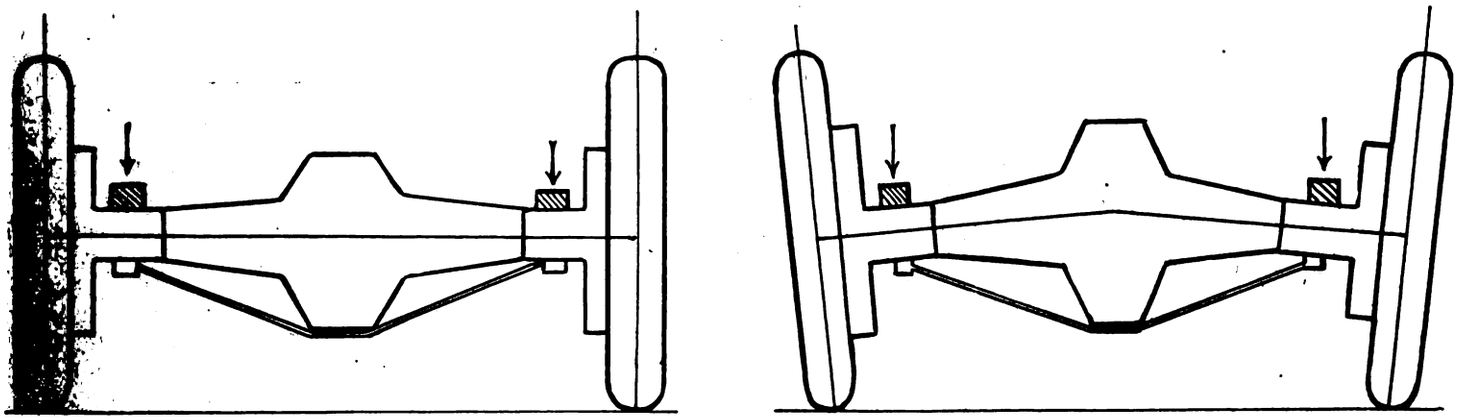
According to Ridpath's encyclopedia, an arch is defined as "a structure composed of separate wedge-shaped pieces arranged on a curved line so as to retain their position by mutual pressure." Church, who is inclined to go more deeply into the mechanics of the principle, describes an arch as "a structure spanning an opening or a gap, depending, for stability, upon the resistance to compression of its blocks, or vousoirs, the material of which is not suitable for sustaining a tensile strain." Though the mechanics of arches in their multitudinous forms is more or less involved. and their comprehensive study requires the equal of an excellent technical education, the underlying principle upon which all arches depend is comparatively simple and is well within the pale of conception of the average man.

The analogy between the arch and the automobile is this: Some manufacturers, though the number is very small, use arched rear axles in preference to the orthodox and very much more popular straight type. Probably because of the extended use of arches in engineering work and the exceptional amount of strength obtainable for a given quantity of material, provided proper percautions are taken in designing, the arched rear axle generally has come to be recognized as being of greater strength, weight for weight, than the straight axle. And there is a possiblity that it really may be slightly the stronger of the two, though there is no data available which will prove the point beyond cavil.

On the other hand, it certainly cannot be any weaker than the straight axle, the weight and quality of material and the class of workmanship being the same in both cases. But if the theory of the arch be studied carefully, without the necessity for recourse to figures or formulæ or abstruse reasoning, it must become apparent that it surely is opposed to the idea that an arched axle can be any stronger than a straight axle.

To cite Ridpath's definition, for instance, which is about as good a definition as can be obtained: "Separate wedge-shaped pieces arranged in a curved line . . . retain their position by mutual pressure." According to Newtons' third law of motion, there must always be an equal and contrary reaction to every action As to sustain weight is an action, it follows that there must be an equal, and contrary, reaction, which is to say that the force acting to sustain the weight must be equal to the force exerted by the weight itself. By reason of the structure of an arch, the weight of the arch itself and any additional weight which is placed on the arch places its separate pieces in compression. Consequently there must be an equal and contrary reaction to balance the action represented by the sustained weight, which could not otherwise be sustained. The reaction, in this case, is represented by the abutments of the arch. If the abutments were removed it follows that the arch would collapse for the simple reason that there would be nothing for the separate pieces to act against and consequently they could not be held in compression.

Substituting the arched rear axle for the arch, and applying the same reasoning, it becomes apparent: First, that as there is nothing to take the place of the abutments of the arch, the axle must collapse. Because it does not collapse proves that it does not follow the principle of the true arch, but relies for its strength not on the fact that the elements are placed in compression, in which case they might be expected to stand considerably more strain than they would in tension, but purely on the tensile strength of the materials. In the true arch, which, as has been pointed out, is composed of a number of separate pieces, no part ever is in tension; all parts constantly are in compression, which in itself is the reason for the arch, inasmuch as the resistance to compression of the materials of which arches are made, whether it be stone, or concrete, or steel, always is far greater than the tensile strength of the material.



DIAGRAMMATIC SKETCHES SHOWING THE CHARACTERISTICS OF STRAIGHT AND ARCHED AXLES

To fall back on the old example of the tied arched roof—merely for the reason that axles of either type generally are tied—it is plain that the only reason the arch remains in position is because of the tie rod. If the rod were removed the arch would collapse, there being nothing (figuratively speaking) against which its ends might abut. The strength of the arch, therefore, depends upon the tensile strength of the tie rod, and consequently the whole structure must be viewed as a beam under a bending strain. If the roof were flat, the tie rod would affect its ultimate strength to the same extent as it does the arched roof. In the former case the roof itself might be lighter, as its materials would stand a greater compressive strain than a tensile strain, though the tie rod would require to be made correspondingly stronger. In the second case the roof would require to be made stronger, in order to sustain the tensile strain of its own weight, but there would be no necessity

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for the tie rod being as strong. In other words, to assume that the sustaining of a roof represents an action, the tie rod represents the contrary and equal reaction.

Substituting the axle for the roof this time, it becomes plain that the tie rod under the axle affects the ultimate strength of the axle, whether it be arched or straight, in the same way as the tie rod affects the strength of the roof, assuming, of course, that the straight axle and the arched axle are of the same weight and quality of materials. In either case, the strength of the axle depends upon the tensile strength of the materials and not upon their ability to resist compression.

In the accompanying diagrammatic sketches, both types of axle are shown and are of average construction. In order to assist understanding, however, the form of the arched axle is considerably exaggerated, the actual amount of arch seldom being more than three degrees and more generally being approximately two degrees; in the illustration the angle approximates six degrees.

If both axles were loaded until a bending strain was caused, an interesting phenomenon, tending to prove conclusively that the principle of the arch actually is absent, would result. In the case of the arched axle, the wheels would spread at the bottom, owing to the reduction in the camber of the axle. As the arch depends for stability upon the fact that its "legs," if the ends may be so styled, cannot spread, it becomes plain that the arched axle is not an arch at all, but that it depends for strength on the tensile strength of the material of which it is constructed. In the case of the straight axle, the bending strain would cause the wheels to incline inward at the top. It is obvious, therefore, that a consideration of the functions of the tie rod does not upset the conclusion that the arched axle is an arch in name only.

Though it may perhaps be inferred that the frictional resistance between the tires and road possibly might serve as the abutments of the "arch" and thus permit the material in the axle to be placed in compressive strain rather than in tension, an example suffices to disclose the absurdity of the idea. Even if it be assumed that the frictional resistance is sufficient there are times when one rear wheel drops into a hole, in which case the frictional resistance not only is lost but if the tire encounters an inwardly sloping side of the hole the actual effect is even worse than it would be if the frictional resistance really were depended upon.

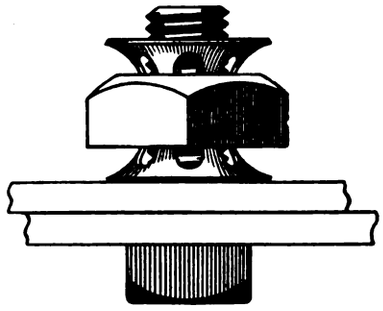
By way of still further indicating the misapprehension which may exist let it be assumed that each spring perch of an axle having an arch of three degrees supports, say, 600 pounds, and that the axle itself weighs 300 pounds. By reason of the distribution of the weight on the axle only part of it acts directly on the apex of the arch, and this part may be placed roughly at 500 pounds; 100 pounds represents the weight of the axle acting directly on the apex and 400 pounds represents the weight of the car. By means of well-known formulæ, the strain acting to force the wheels apart at the bottom may be computed to be approximately 50,000 pounds. Against this pressure there is only the frictional resistance between the tires and the road, which, allowing 1,500 pounds as the total weight on the tires and a coefficient of friction of as low as 0.5, amounts to some 750 pounds. To repeat Newton's third law of motion, namely, "every action must have an equal and contrary reaction," the absurdity of considering the frictional resistance between the tires and the road as sufficient to hold the wheels together becomes plain.

As to what may be the effect on the stability of the car and the ability of slightly "dished" wheels which the arched axle permits to resist fracture, there is a wide diversity of opinion, though it appears on the whole that the advantages and disadvantages of each system very nearly balance. The arched axle, of course, necessitates that there be some means of flexibly connecting the drive shafts with the differential mechanism, but this in itself is comparatively easy of solution, and as the angularity between the shafts and the differential pinions is very slight in any case the amount of power used up in friction in the coupling is so small as to be practically negligible.

There is one point on which the arched axle scores, however, and that is on appearance. It is conceded by not a few that a slight outward inclination of the tops of the wheels makes for a more pleasing effect. Obviously, there are an equal number who abhor "dished" wheels. After a car with a straight rear axle has been run for a couple of seasons, however, there is the likelihood that the axle may have sagged slightly, in which case the tops of the wheels will incline inward, and even if the inclination is not sufficient to cause the tires to come in contact with some other part of the body, the effect will be unsightly at least. With the arched axle, on the other hand, considerable sagging might take place before the wheels would incline inward to any appreciable extent.

Simple Means for Keeping Nuts Tight.

One of those little things that are simple, inexpensive and yet valuable is the lock nut—a device that has been made in a great variety of forms, all more or less effective. Perhaps the simplest of the number, however, is the new Worth wedge washer, manufactured by the Steel Specialties Co., of Boston, in styles and sizes suitable for all sizes of bolts and all threads. It is simply a steel washer stamped into a conical form, with its inner edge toothed. As the illustration shows, the washer is applied under the nut with the teeth up, and the nut screwed down upon it, the wedging action forcing the teeth into the thread of the bolt and holding the nut securely. If a few threads of the bolt project above the nut a second lock can be applied, with the teeth toward the nut, and locked by forcing down the outer edge with a piece of pipe and a hammer, or by screwing a second nut down on it until the washer "turns inside out," to use the maker's expression.



WORTH WEDGE WASHERS

An Extortion Scheme That Failed.

Apropos of the many schemes that chauffeurs work to extort money from the unsophisticated, the following story is told by a New York motorist who is the posessor of two cars, and who suffered an accident last week in which the car he was driving broke its steering knuckle. There was nothing for him to do but to have the car towed home. He accordingly despatched his chauffeur to get the other car and a rope in order to perform the towing operation, and in the meantime, after fussing around with the interior of his car and getting thoroughly soiled, he sat down in the driver's seat to wait for the return of the other machine.

While he was sitting there an automobile with two young men of the chauffeur type riding in it came up. They sized up the situation at once and saw that he was in need of help. One of them hopped out of the car and walking over to the owner, who was sitting on the front seat, said: "All right, young fellow, we got a telephone message from your boss giving us the number and we are here to tow you to the garage."

The owner of the car concealed his amusement and merely said: "I don't move from this spot no matter what telephone message you got." The other fellow blustered a little and insisted that he had a message ordering him to look out for a car broken down of the same number of this machine and wound up by saying he'd bring suit against the man for the expense of going out to look him up if the car were not towed in by him.

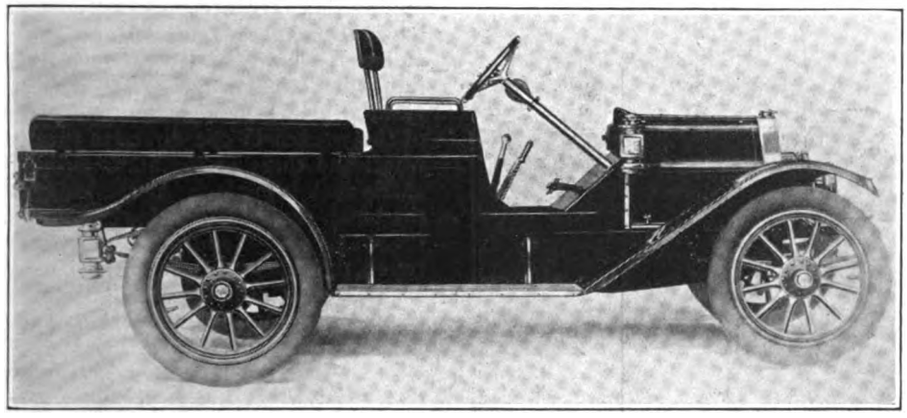
Finally the owner declared himself and the two beat a hasty retreat. If they had been able to get away with it they probably would have extorted a good bit of money from the automobilist for towing his car uptown.

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OVERLAND ADDS TWO NEW WAGONS

Both of 800 Pounds Capacity and Employ Sliding Gears and Pneumatic Tires—Center Control a Feature.

That there is a field, and a big one, too, for the light motor delivery wagon daily is being demonstrated with greater conclusiveness. "Big Business," having delved deeply into the possibilities of the heavier commercial vehicles with gratifying results, slowly but surely is turning to the light motor wagon as a solution of terminal distribution problems embracing the necessity for rapid short hauls with comparatively light loads, and the results which have been achieved in a notable number of cases in which light motor delivery wagons have been used as auxiliaries to heavier trucks demonstrates the correctness of the theory. To the proprietors of smaller businesses, the light delivery wagon opens up a very much wider field, of course, a field that must of necessity remain barren to the merchant who relies on horsed equipment, with its limited radius of action and its inherent slowness. In appreciation of these facts, the Willys-Overland Co., Toledo, Ohio, just has placed on the market two new light delivery wagons which fit in between the truck and the package delivery car, and thus reach into the widening field heretofore occupied largely by horsed vehicles.

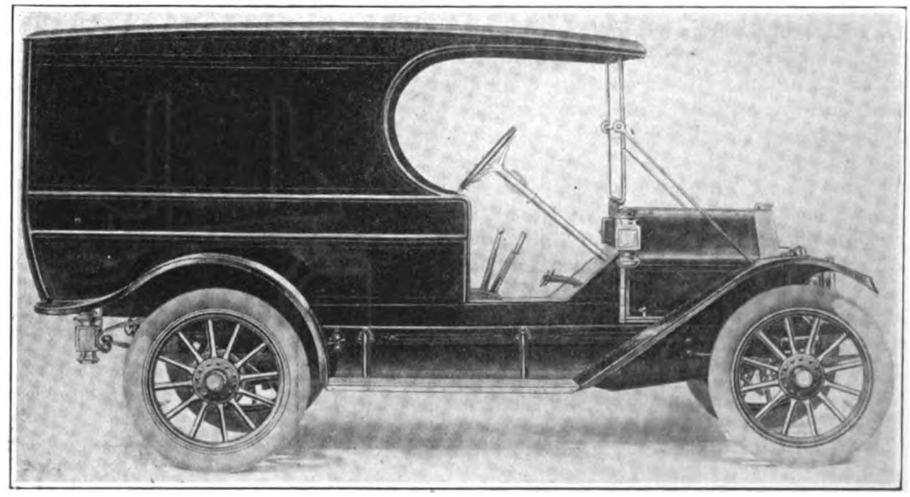


OVERLAND 800 POUNDS CAPACITY OPEN EXPRESS WAGON

Like the older commercial vehicles in the Overland line, the two new creations are essentially adaptations of the company's pleasure car chassis, and as such reveal many of the distinctive features which in the past have marked Overland cars.

The chassis of both the new wagons is exactly the same, the wheel-base being 106 inches. As its name suggests, model 59, which is styled a "Delivery Special," is a closed panel body wagon with an available loading space of 60 inches by 43 inches, the height from the floor to the top being 53 inches. The loading space on the "Express," which lists at $950, being $50 cheaper than the "Special," measures 67x42 inches; the height of the sides is 10 inches and the width of the side wings is 6 inches. In conformity with the nature of the loads which it is expected will be carried, and the capacity, which in each case is 800 pounds, both vehicles are equipped with 33x4-inch pneumatic tires mounted on quick detachable rims.

As regards the chassis, the motor is rated at 30 horsepower, the cylinders measuring 4x4½ inches bore and stroke, respectively. Cooling is by water, and for ignition Splitdorf equipment, consisting of a high tension magneto and an auxiliary battery system, is used. From the motor, power is transmitted to semi-floating rear axles through the intermediary of a cone clutch and three-speed selectively operated change gear mechanism. Like the newer Overland pleasure cars, the control levers, gear shift and emergency brake, are located in the center of the footboard, which position, it is deemed, permits of the greatest accessibility and facilitates control. The steering wheel is at the right, as usual. Two sets of brakes are provided, the service brakes being internal expanding and the emergency set external contracting, both operating on 10x2 inch drums on the rear wheels.



OVERLAND "DELIVERY SPECIAL" WHICH LISTS AT $1,000

REDUCING THE DANGERS OF GLASS

French Test of New Material That Appears to Hold Promise—Its Relation to Windshields and Windows.

While the great majority of accidents which now occur are caused directly or indirectly by carelessness and rarely ever can be attributed to faulty construction or the use of poor material, there is still at least one vulnerable point in modern car construction the elimination of which will lessen to a greater or less degree the dangers attendant upon such accidents. This vulnerable point is none other than the glass used in the windshield on nearly every car, and in the windows and doors of all the enclosed types of cars.

It is not unlikely that this source of danger will be present to a greater or less degree as long as motor cars are used, for at the present no substitute for glass which is really worthy of the name has come to light. True, celluloid has been tried, but it is expensive, easily scratched, very subject to damage by the elements and the various classes of grease used in motor propulsion, and, moreover, is highly inflammable. Until that very indefinite period when the composition of glass will be so altered as totally to eliminate, or at least greatly diminish its characteristic brittleness, it is quite evident that breakage will be of more or less common occurrence, so that at present the real problem involved in the protection of the motor car occupants from harm from this source of danger lies rather in the elimination of the flying splinters after the glass has been broken than in the elimination of chance of breakage.

To this end glass panels in which wire mesh of various sizes and composition are fused have been tried; however, there are several drawbacks which militate against the use of such panels. Unless the mesh

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openings are rather small, the number and size of the splinters which fly are not greatly diminished, and if the openings are small the view of the road is obstructed. Then, too, if the mesh is made of any other metal than aluminum the reflection of the sunlight from the polished surface of the very numerous strands nearly blinds the driver; glass so armored is very likely to crack during temperature changes owing to the difference in the coefficients of expansion of the metallic substance and the glass, and, moreover, the cutting and fitting is very much more difficult than with ordinary glass.

According to Omnia, a series of very interesting tests has been carried out in France to determine the value of a new product, "triplex glass," which is made up of a sheet of celluloid cemented under pressure between two pieces of glass.

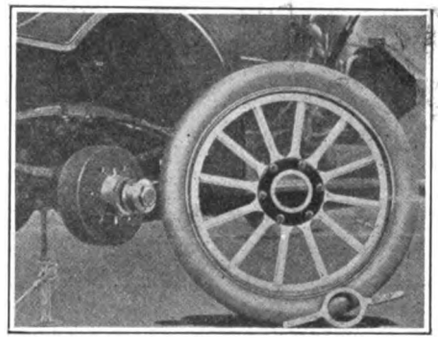
The tests were conducted to determine the relative quantity and distance to which they were projected, of the splinters from a sheet of plain glass, wire mesh armored glass and "triplex glass" when sheets of the same were subjected to shocks or blows of the same intensity. Each sheet tested was 20 centimeters square and was supported vertically in a wooden frame; each sheet was struck my a metallic ball weighing 900 grammes, which was fastened to the end of a flexible cord, the other end of which was made fast to the ceiling at a distance of 3.75 meters above the center of the pane. The ball traveled in a curvilinear path, the length of which was the same in each case. The blows were therefore constant. Tests were made on ten sheets each of the plain, wire mesh and "triplex" glass. The average of the results shows that whereas with the plain glass 80 per cent. of the total surface was broken into splinters which were projected, with the wire mesh glass 30 per cent. of the glass was splintered and projected, while with "triplex" the splinterage amounted to but 2 per cent. A correspondingly great divergance in the distances over which the splinters of the different sheets traveled is shown in the average of the results; with the plain glass the splinters traveled 5.7 meters, with the wire mesh glass 5 meters, while with "triplex" the distance to which the splinters were projected was but 20 centimeters. The thickness of the glass was five millimeters for the plain, and seven and six millimeters, respectively, for the wire mesh and the "triplex."

The glass is made with the celluloid supported between plate glass for use in windshields, and between ordinary window glass for use in the doors and windows of the enclosed car. The manipulation is very much more easy than is the manipulation of the wire mesh armored glass. To cut it, it is simply necessary to scratch in the ordinary manner save that a scratch is made on either side. The glass is then cracked along the double scratch and bent first one way and then the other for a few times until the celluloid parts.

SIMPLIFYING DEMOUNTABLE WHEELS

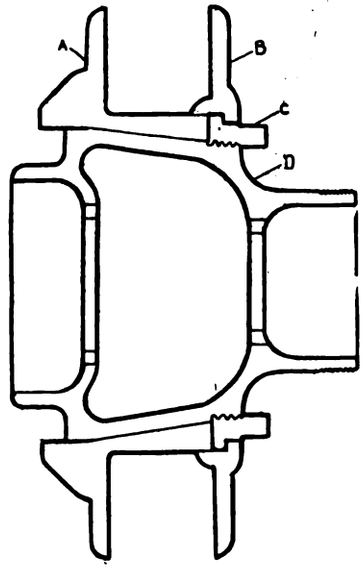
Chicago Firm Makes a Stride in That Direction—Renders Unnecessary Even to Remove Hub Cap.

As a solution of the problem of providing a quick and easy method of replacing a deflated tire with an inflated one, Ellsworth & Cross, 332 South LaSalle street, Chicago, Ill., have developed and placed on the market a new type of demountable wheel the characteristics of which are such that it should go far toward increasing the popularity of such devices. In perfecting



E. C. DEMOUNTABLE WHEEL

the wheel it has been the object of the manufacturers to eliminate as many removable parts as possible and so successful have they been that the wheel itself is the only part which can be removed. Further-



E. C. WHEEL HUB CONSTRUCTION

more, it can be removed without the necessity for disturbing either the hub cap, the axles, or the brake drums.

Barring the inherent simplicity of the mechanism, probably its principal advantage is that the demountable joint is well above the road, at an easy working height, where it is not liable to accidental injury and where it is comparatively free from the insidious action of the elements; the joint itself is machined to insure that the wheel runs absolutely true. Another of the advantageous features of the wheel is that it is self-pulling under all conditions. In order to obtain this feature, the wheel itself has an inner flange (A), as indicated in the accompanying illustration, and an outer flange (B), which are independent of the wheel hub (C), but which fit the latter through a taper joint. Housed between the two wheel flanges is the locking and pulling ring (D), which extends a short distance through the outer flange, thus providing a sleeve with two opposite holes into which pins on the special wrench provided with the equipment fit. Three turns of the wrench in one direction remove the wheel and three in the other direction securely lock it in place. At the inside end of the taper, there are two lugs which engage the wheel flange and make movement between the taper and the wheel impossible.

In order to insure against the wheel coming loose on the road, the locking and pulling ring is provided with ratchet teeth around its periphery into which two dogs drop as the ring is screwed up into place. These dogs, which are not shown in the picture, are housed in bosses in the outer flange, and when the wheel is to be removed are pried up and hooked out of engagement temporarily. That there may be no danger of their being left out of engagement when a new wheel is put on, however, the wrench is so shaped that it automatically releases them, making it impossible to tighten up a new wheel without its being securely locked.

Skull Crushed by Motor Truck Chain.

What probably is the first accident of the sort with motor trucks occurred on Friday last, 29th ult., on Lenox avenue, near 133d street, New York City, resulting in the death of Lemuel Reese, a seven-year-old boy. According to the testimony of eyewitnesses, the boy was roller skating and was trying to get hold of a passing motor truck belonging to the National Sugar Refining Co. A lurch of the truck brought his left arm into contact with the heavy driving chain, and the boy's body was dragged into contact with the sprocket, where his skull was crushed.

Automobile Instruction for Vienna Police.

Heeding the call for better informed policemen, the city of Vienna has decreed that every member of the police department must go through a three-weeks course in practical automobile instruction, in order to be at least fairly conversant with the chief characteristics and the handling of motor cars in cases of emergency. The training course is divided into two parts; the first week is spent in the Technical High School in listening to theoretical instruction in the construction of automobiles; and the second and third weeks in the Fiat factory.

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"WATERED MIXTURES" TO PROMOTE EASY OPERATION

Old Subject is Revived and Discussed and Point Given to It in an Address to Agricultural Engineers — Government's Experiments With Gasolene and Alcohol Fuels Recalled and Success With Heavy Distillates Emphasized.

Long years ago, when the development of the gas engine was still in its infancy and pertinent information regarding the properties of explosive mixtures of gas and air was decidedly lacking, pioneers in the experimental field concluded that the internal combustion motor should be patterned more or less after its prototype, the steam engine. To this end the valve gearing and the crank gearing assumed a decided steam engine pattern, and it was only after repeated experiments had proved the good points, and pointed out the bad ones, that the internal combustion motor design became more or less distinctive. It is not surprising that the experimenters directed no mean part of their efforts toward the control of gases after the introduction of the ignition flame in unsuccessful endeavor to limit the initial pressures, which are naturally high, and to produce a working pressure behind the piston which would be constant throughout the stroke, for it was thought that by this means the thermal efficiency of the motor could be made more nearly to approach that of the steam engine.

Naturally the lines of experiment were many and divergent. Everything from stinting the mixture and specially designing the combustion chamber to the introduction of steam and hot water with the explosive mixture were tried with little success. But this does not imply that the initial pressures were not reduced. Reduction there was and plenty of it, but with this reduction came a decided drop in efficiency, especially where water was introduced. This falling off in the thermal efficiency scarcely can be wondered at when it is considered that the engines which were used for the experiments fired the charge at asmospheric pressures, and the flame propagation, which naturally is slow in gases not under pressure, was further retarded by the contamination of the mixture with water.

Experiment along the line of the injection of "watered mixtures" lay practically dormant for a long term of years after these first failures, which were conducted by Lenoir, a Frenchman. Not until the internal combustion motor was brought to its present state of perfection were any experiments along the line which proved of any practical value recorded. Not the least interesting of these later experiments are those conducted by the technologic branch of the United States Geological Survey to determine the relative values of denatured alcohol and gasolene as fuel for combustion motors. The conclusions drawn from this rather exhaustive series of tests are that although the introduction of water tends to decrease the power available from a motor if the degree of compression before firing is not altered, the practice has much to recommend its adoption in that a much smoother running motor is produced; much of the jar consequent on the rapid expansion of the gases after ignition is eliminated and "steam engine" smoothness of operation is the natural result.

When, however, the water is introduced it is possible to increase the degree of compression without causing pre-ignition. The tests show that under the circumstances the compression can be increased to 140 pounds to the square inch, about double that adhered to in the design of gasolene motors. With the compression so increased all of the losses consequent on the absorption of heat by the water and the retardation of the speed of flame propagation are compensated for by the advantages of the higher degree to which the gas is compressed, and the power available is equal to that available from the motor with normal compression working without water. A general smoothness of operation, however, obtains.

Not long since, however, it was noted that the introduction of water in suitable quantities into the combustion chamber of a motor using as fuel any of the lower grades of petroleum, such as kerosene and distillate, had besides all of the effects which obtain with its use in a gasolene motor three others—the promotion of complete combustion, elimination of the smoke of the exhaust and reduction in the formation of carbon deposit. The exact reason or the reasons for these effects, all of which are good effects, is at present a matter of conjecture pure and simple, but some interesting sidelights were thrown on the subject by James A. King, of Charles City, Iowa, in a paper, "Low Gravity Fuels for Internal Combustion Tractors," read at the recent annual meeting of the American Society of Agricultural Engineers. Speaking of the chemical action to which Mr. King considers the results to be due, he said:

"Into the problem of burning the heavier oils there enters a chemical peculiarity inherent in the more complex hydrocarbons. They are subject to what is known as 'cracking.' At a given temperature any one of them with a molecular formula above a certain degree will break down into a simpler compound.

"This temperature of cracking is below the temperature of ignition, and takes place without producing ignition. In this process of cracking a given molecule will break down into one or more molecules of the same series. Except in the naphthene or ethylene series this cracking results in the setting free of carbon.

"Since the paraffin series predominates in most of the petroleum fields of the United States, I shall confine this discussion to that series. The following equation will tend to illustrate what takes place when an oil cracks:

(1) $C_n H_m$ + Heat = 2 $C_r H_s$ + C.

"As stated before, the temperature at which cracking takes place is lower than that of ignition. Consequently, this freed carbon immediately assumes a molecular state. This molecular carbon, unless prevented from doing so, is deposited as amorphous carbon and it is well known that amorphous carbon is decidedly inactive under normal conditions.

"The above illustrated action will explain why it is that the ordinary gasolene engines will not successfully burn these lower gravity fuels for any considerable time without a serious carbonization of the working parts of the cylinder and piston.

"In view of the facts set forth above and which are to follow, it is rather difficult to understand the credence given to the statement made after the close of the 1911 Winnipeg motor contest, that any engine will successfully burn kerosene and distillate simply by making a slight change in the carburetter by which the ingoing charge is heated so as to hasten the process of vaporization. They will burn it, yes. But to burn it successfully they must do it with the greatest possible economy and efficiency. To do it with economy an engine must get maximum combustion with minimum expense or intereference with the working of the engine. To do it with efficiency the engine must burn this fuel in such a way as to realize a maximum percentage of the heat of combustion as useful work. In either case the engine must continue to do this throughout its normal life, not for a few hours or days. And it cannot do this without providing some means of uniting this freed carbon with oxygen under conditions which shall render the resulting liberated heat available as work.

"It was noted that when a charge of

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petroleum testing between 55 degrees and 38 degrees Baume was ignited in the presence of a small quantity of water vapor, the combustion is much more rapid and complete than when the water is absent. Recognizing this fact, some manufacturers of kerosene burning engines provide some system for spraying a small quantity of water into the cylinder coincident with the spraying of the fuel.

"The following chemical equations seem to explain the reactions which take place from the time the charge is drawn into the cylinder until combustion has ceased:

(1) $C_{16}H_{34}$ + Heat = 2 C_7H_{16} + C.
(2) C_7H_{16} + 7 O_2 = 7 CO_2 + 16 H.
(3) 2 H_2O + Heat = 4 H + 2 O.
(4) C + O_2 = CO_2.
(5) 4 H + O_2 = 2 H_2O.

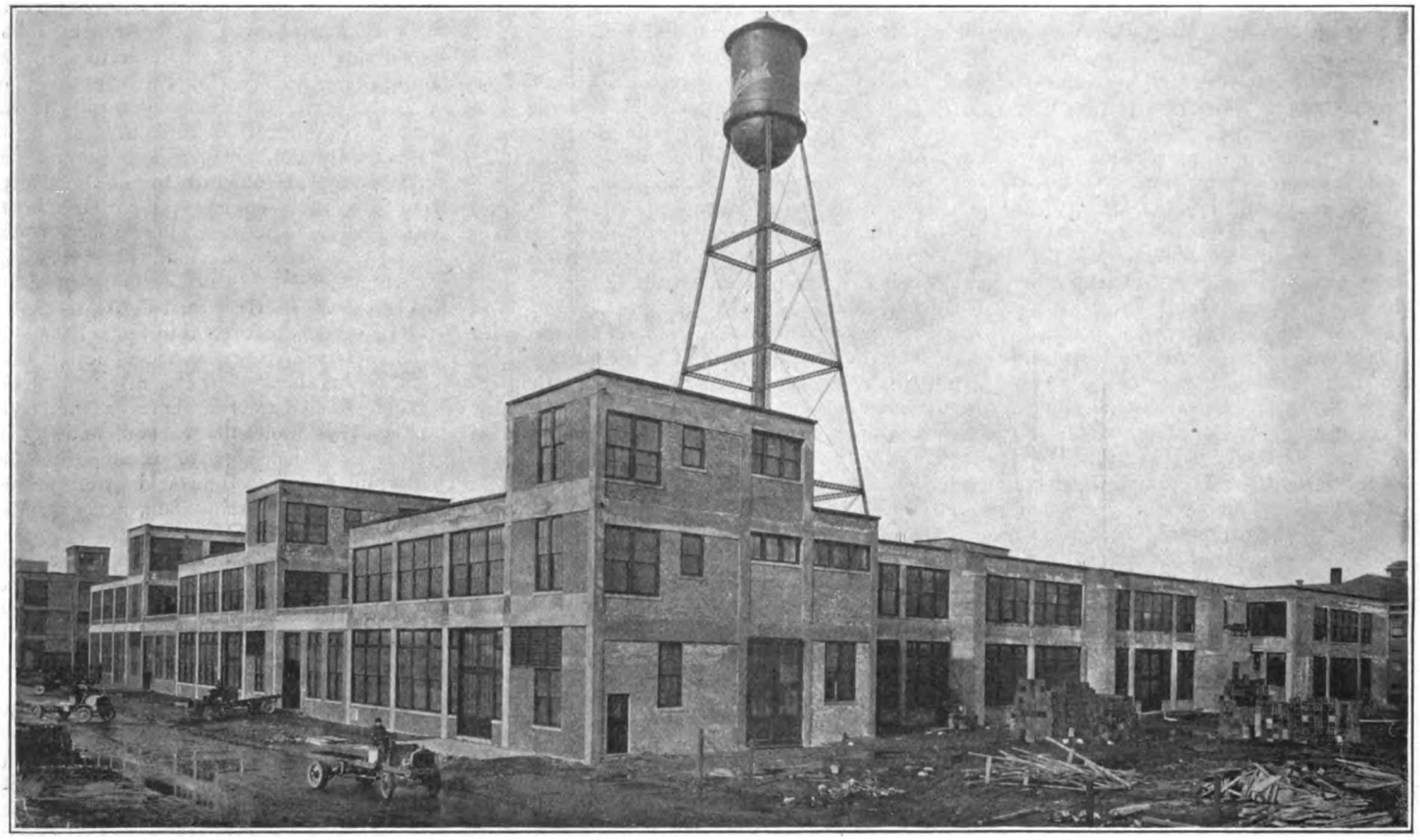
"As has been stated, reaction (1) takes place before ignition and is the process known as cracking. When the electric spark has ignited the charge a reaction such as (2) takes place. The heat generated by this is sufficient to run the temperature inside the cylinder of an engine working on normal load up to about 3,000 degrees Fahrenheit. This temperature is sufficient to dissociate water and so the hydrogen of (2) does not unite with oxygen when released by the carbon in favor of oxygen, but remains free. At the same time reaction (3) takes place because of the high temperature generated by (2).

"Now, free carbon and normal oxygen of the atmosphere unite only at very high temperatures, higher than those produced inside the cylinder of a working engine. But nascent oxygen is much more active, uniting at lower temperatures. So reaction (4) is coincident with (3). The nascent oxygen liberated by the dissociation of water in (3) unites immediately with the free carbon. Reaction (4) would liberate heat in compensation for that absorbed in (3), so that the pressure here would be maintained.

"Due to the law of temperatures of gases under compression, as the piston moves outward the temperature of the gases within the cylinder decreases because of this expansion. At some point in the outward stroke the temperature falls below that of the dissociation of water. It is then, and not until then, that reaction (5) takes place. In this reaction the oxygen is that of the air and the hydrogen is that which was set free in reactions (2) and (3)."

Further on in his paper Mr. King states that the introduction of water with the fuel, besides tending to eliminate carbon deposit, "increases the efficiency of the engine and also of the fuel by its effect on interior temperatures. These more complex fuels always run an engine hotter than do the simpler fuels when pulling the same load. This difference in temperature seems to exist especially at the compression end of the cylinder. If an engine's cooling system is designed to let the engine work at the highest temperature consistent with efficiency when working on gasolene, it will, when burning the heavier fuels, soon become so hot that the piston will bind and even stick in the compression end of the cylinder if no water spray is used. But the use of water overcomes this difficulty. The dissociation of the water, as shown in reaction (2), absorbs a great amount of heat and so reduces the total temperature of the cylinder chamber. Of course, this heat is again given up in reaction (5). But when (5) takes place the temperature has dropped below that point where it interferes with the proper working of the engine. So that the action of the water is not to decrease the total amount of heat units liberated during the entire process of combustion, but to so distribute it throughout the entire volume of the cylinder that the cooling system can properly control it. In fact, the presence of the water increases the total amount of heat units liberated, because it makes possible reaction (4)."

WHERE PACKARD TRUCKS ARE PRODUCED IN DETROIT



Newly constructed plant which occupies an entire city block and contains 100,000 square feet.

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USES GASOLENE IN "WATER JACKET"

The "Boiled" Gasolene Then Automatically Injects Itself Into Cylinder—Other Features of a Remarkable Engine.

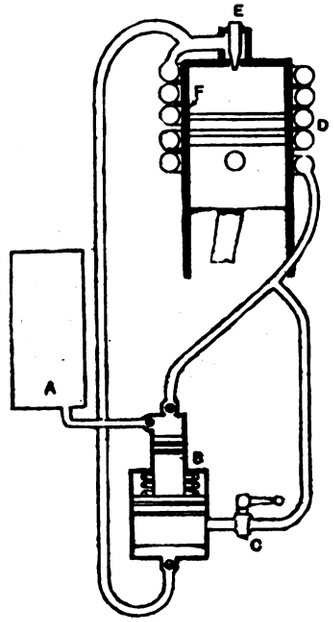
No matter what form the internal combustion engine of the future may take, and there have been any number of forms suggested, it is certain that its thermal efficiency will be very considerably higher than that of existing engines. At present it is not possible to utilize all the heat that is generated, and it never will be possible. Gradually, however, engineering practice is reducing this loss of heat and because of the concurrent increase of thermal efficiency, the ratio of power available to the weight of the machinery comes closer to its theoretical value. In respect to what eventually may be expected in the way of increased thermal efficiency, the Low engine, which is the invention of Archibald R. Low, of the British Low Accessories Co., is interesting not only because of several radical characteristics but because it indicates quite plainly the general tendency toward fuel injection as the most practical means of utilizing the greatest possible amount of heat generated.

The engine itself is not altogether unlike the now famous engine of Dr. Diesel, the thermal efficiency of which gradually has been brought up to the remarkable figure of 48 per cent., with a corresponding mechanical efficiency, in some cases as high as 35 per cent. of the heat value of the fuel. Like the Diesel, the Low engine shows notable thermal efficiency, exceptionally high mechanical efficiency resulting as a matter of course. It is said that an experimental two-cylinder V type engine having a bore and stroke of 51 mm. and 102 mm., respectively (2 x 4 inches) actually developed between 16 and 18 horsepower on the brake. By common proportion, allowing a fair percentage for friction, it becomes plain that an ordinary four-cylinder engine with a bore and stroke of say, 4 x 5 inches, if its thermal efficiency corresponded to that of the Low engine, would develop in the neighborhood of 100 horsepower.

In principle the Low engine is quite similar to the Diesel engine in that only pure air is compressed. The similarity is carried still further in that fuel in the form of pure gasolene vapor is injected into the combustion space after the compression of the air is complete, though the similarity ends there. Far from doing away with sources of ignition other than that of the heat of compression, ignition in the Low engine is effected by a spark coil and plug and is continued during the whole of the working stroke, the theory being to effect as complete combustion as possible.

The most radical feature of the engine and the one on which it depends for operation and its remarkable efficiency, is that the ordinary water jacket is replaced by copper tubes which contain gasolene instead of water. In starting the engine an ordinary type of carburetter is used and the engine is run until a certain pre-determined heat is obtained, when the carburetter is disconnected and the other cycle of operations is taken up. What actually happens is that the gasolene in the outer tubes literally is boiled into vapor (gasolene boils at temperatures varying from 125 to 200 degrees, according to its specific gravity), and under its own pressure is injected into the combustion space through a valve automatically operated by the piston. The explosive mixture so obtained then is fired by means of a spark plug and coil in the orthodox manner.

One of the peculiar features of the gasolene vapor valve is that by reason of its



LOW ENGINE IN DIAGRAM

method of actuation, which at present is one of the dark secrets of the inventor, it opens very abruptly but closes comparatively slowly, the result being that vapor is injected for a considerable portion of the working stroke. The effect obtained is that the piston receives a steady thrust rather than an abrupt and intermittent series of blows, and consequently the torque diagram of the crankshaft shows appreciably flattened "peaks." The burned gases are exhausted in the usual way by means of a third valve.

Preignition is impossible, of course, for the simple reason that only pure air is compressed. This permits of exceptionally high compression pressures being used and is responsible in a measure for the unusual thermal efficiency of the engine. Perhaps the part of the engine which shows the greatest ingenuity on the part of the inventor is involved in the method of maintaining the supply of gasolene in the jackets. This is effected by means of a pump of the Worthington type which operates by the pressure of the gasolene vapor itself to inject fresh gasolene into the heating jackets after the manner of locomotive pumps which maintain the supply of water in the boiler by variations in the steam pressure. The pump, which is shown in the accompanying sketch, is of the differential piston type and operates against a spring. When the pressure in the gasolene vapor line drops, as when vapor is injected into the combustion space, the spring is permitted to expand and the lower end of the pump cylinder draws gasolene from the tank. As the pressure in the vapor line rises, due to the heat, the spring is compressed and the gasolene is injected into the jackets. The piston of the pump therefore "floats" while it reciprocates rapidly up and down, maintaining the supply of gasolene in the jackets.

In order to throttle the engine a valve controlling the supply of gasolene to the pump is provided, and this is interconnected with the air inlet valve in such a way that the cut-off regulates the supply of gasolene. Consequently, the quality of the explosive mixture remains constant at all times though the quantity may be reduced or increased according to the power requirements of the operator.

Bosch Puts Period to First Million.

When a manufacturer of anything larger than needles, pins, carpet tacks or toothpicks turns out his millionth article, he of right views it in the nature of an "event." And an event of that sort occurred in the history of the Bosch Magneto Co. when on March 15th the millionth Bosch magneto was turned out, the total representing the combined production of the factories here and abroad. It served to emphasize the expansion of the Bosch business since it was established in 1888 at a time when automobiles were dreams or curiosities and automobile magnetos unthought of.

The Proper Spreading of Split Pins.

One of the mistakes that very commonly is made, not only by amateurs but also by "professionals," is to spread the ends of split pins too far apart, so that if it becomes necessary to remove the pins considerable work is required in order to get the ends together. Pins that are likely to remain permanently in place may, of course, be spread to the limit; but those which are liable to be removed should be spread just enough to keep them from working back through the holes, which is all that is necessary.

Forcing Bolts in Place by Hammering.

A bolt that requires an excessive amount of hammering to get it into place is apt to be greatly weakened at the point where the head joins the shank, and an abnormal strain or shock may pull the head off. It is better to take just a trifle of metal off a bolt than to force it by means of heavy blows. A few strokes of a file generally will suffice.

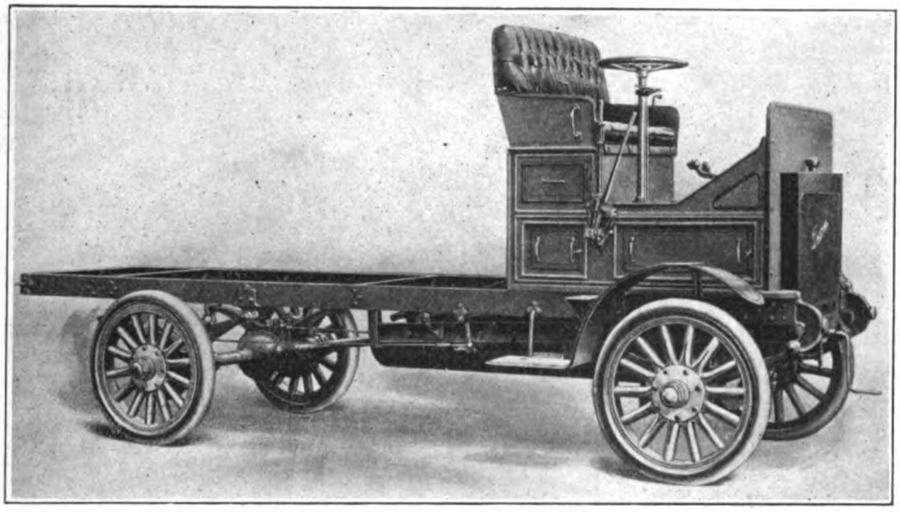
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TRUCK WITH SUPPLEMENTARY AXLE

Purposes Which it Serves on the Piggins Vehicle—Cast Aluminum Front Construction and Other Features.

While the trucks and delivery wagons manufactured by the Piggins Motor Truck Co., of Racine, Wis., are in most respects of what may be termed standard design, embracing well-known and widely employed structural features, the final drive is of a type which, while not by any means new, is as yet unusual in an American machine.

On the rear axle, which is of solid steel of square section, is journaled a supplementary axle, the sole duty of which is to transmit power from the propeller shaft to the rear wheels; it carries no weight whatever. The supplementary axle is divided in the middle and carries the differential and bevel gear for the propeller shaft drive. On the outer ends of the axle shafts are spur pinions which mesh with internal gears bolted to the rear wheels. A casing encloses the gears, excluding dust and dirt, and, of course, facilitating lubrication. This system of final drive has its advantage, among others, in that it gives a gear reduction which permits the use of a comparatively small bevel gears for the propeller shaft drive, thus keeping the size and weight of the central gearing and housing down to very reasonable proportions, as the accompanying illustration of the Piggins rear axle system shows.

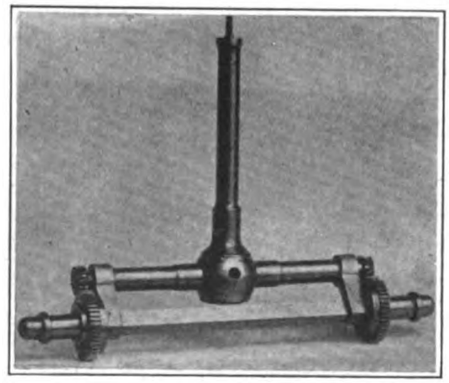


PIGGINS CHASSIS WHICH EMPLOYS EXTERNAL GEAR DRIVE

The motor of the three-ton truck, which is the machine illustrated, is of the T-head type, having four cylinders. Bore and stroke are 4½x5 inches, respectively, and the motor is rated at 40 horsepower. Lubrication is by splash, with a constant circulation of oil maintained by a pump. A dual ignition system is employed, with a Briggs low tension magneto and a battery of dry cells as the alternative source of current. Particular attention has been given to the radiator, in order to make it sufficiently strong for the severe service, the various parts being riveted together, in addition to the usual soldering, and the whole radiator strongly braced with bronze plates at the sides and on the bottom. These plates have cast integral with them the lugs for the holding-down bolts. The pump is of the gear type; the water capacity of the system is about 10 gallons.

Besides the rear axle and final drive already described, the transmission system includes a large leather-faced clutch, a three-speed Cotta change gear and a universal-jointed propeller shaft.

The entire front construction of the body, including the seat, toe-boards and floor-boards, is of cast aluminum, convenient openings being arranged, with suitable covers, giving access to the engine, which is under the seat and floor, and to the space under the seat. Four-inch channel steel is employed for the framing, with heavy steel gusset plates at the corners; all holes are drilled, not punched, and rivets are put in hot.



PIGGINS "DOUBLE AXLE" CONSTRUCTION

Piggins cars are built in five sizes, ranging from a half-ton delivery wagon to a five-ton truck. With the exception of the lightest machine, all embody practically the same mechanical features, differing chiefly in the matter of dimensions and weight. The smallest machine has the motor in front under a bonnet or hood.

With the exception of the engine, all bearings are ball bearings of the radial type; the engine bearings are of nickel babbitt. A dust pan under the truck protects the engine and other mechanism from dust and flying dirt. The wheel-base of the car is 120 inches; all wheels are 36 inches in diameter, and are fitted with solid rubber tires. There is a space of 11 feet in length and 40 inches wide back of the box seat that is available for loading purposes.

Equipment consists of acetylene headlight with gas tank, two oil side lights and oil tail light; top, with side curtains; three-ton jack, and set of tools. While a specialty is made of bodies of any type, unless otherwise ordered, trucks are furnished without bodies, with only the front seat in place.

Little Things That Affect Truck Engines.

On a motor truck, the engine of which is likely to be run much nearer its capacity than the engine of a pleasure car, it requires considerably less of inaccurate adjustment to cause trouble, in some cases, than in the lighter machines which have a much greater margin to come and go on, to use the common expression. For instance, a little loosening of the fan belt in combination with a slightly rich mixture, occurring in hot weather, may be quite sufficient to make the motor overheat every time a moderate grade is climbed. Flat fan belts are more liable to slip, as a rule, than those of V shape, unless made of ample width so that they stretch very slowly and have a large area of contact with the pulleys.

Sand Boxes or Chutes for Motor Trucks.

A box full of sand is a very handy adjunct for a heavy motor truck, especially when the route necessitates much travel over roads which are converted into mud holes by the early spring thaws. Probably two boxes provided with chutes so that the contents can be discharged in front of the traction wheels at such times as is necessary, and which can be operated by a pedal from the driver's seat, would save the driver considerable time and not a little bother.

Glycerine That Preserves Radiators.

Glycerine regularly is used during the winter months to lower the freezing point of the cooling solution. But there is no reason why it should not be used during warm weather as well, not to prevent freezing, of course, but to eliminate the formation of scale in the radiator. One-half pint to each five gallons of water will suffice. The practice is in quite general use so far as steam boilers are concerned, especially on marine boilers.

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"CHAUFFEUR FACTORIES" AND THEIR METHODS

"Big Money and Easy Work," the Lure That Has Led to Much Disappointment and Has Overstocked the Market With "Graduates"—High-Sounding Catch-Phrases That Are Employed and How They Match With Stern Reality.

"Be a chauffeur and earn big money!"

It is many years since more or less startling advertisements conveying, more or less specifically, the idea expressed in this exhortation commenced appearing in daily papers and magazines, and it is safe to believe that they will continue to appear just as long as the population of the earth includes considerable numbers of that sort of persons who are born every minute or those who are incapable of earning more than a pittance, but who possess unfathomable yearnings for occupations which will yield generous returns for a small investment of labor.

While the ball was started rolling, in all probalibity, by concerns wanting canvassers and who advertised for men to "do a gentleman's work and reap a harvest," or "look at Mr. Jones, who earned $43.79 the first day; you can do the same," it has been kept moving at a lively rate by "institutions of learning" of all sorts, from those who guarantee to train the voice by mail to the "secret process" fraternity. But it is doubtful if any particular part of the educational field ever was so assiduously and so successfully cultivated as the automobile school idea. Naturally, the aeroplane movement has stirred up considerable activity in educational circles of a sort, and. to judge from some of the advertisements, anyone can now be taught to fly by mail "by the use of our wonderful models" and a series of printed lessons; some of the automobile schools have modestly tacked aviation to their curriculums, as is quite appropriate. But as yet the freest flowing fountain of knowledge is that from which motor car lore springs, and there is no sign of diminution of the stream. "Learn to fly and win fame and tortune" has an alluring sound, but "Be a chauffeur and earn big money" sounds a lot more practical, for everyone knows that aeroplanes are comparatively scarce, while automobiles as yet are as the sands of the sea by comparison.

Let it be said that there are schools of instruction, many of which give courses by mail, that are absolutely honest, that give excellent instruction, that promise no more than they can perform, that do not indulge in bombastic advertising, and that make charges that are not of the bargain order, but warrant the expenditure of the time and trouble required to teach that which is claimed to be taught. Such institutions are in a class by themselves, and are by no means to be confounded with those that flaunt the lure of "big money and a gentleman's job."

Not the least interesting phase of the automobile school business of the "cheap and quick" class is the shrewdness displayed in the struggle to enroll students. Of course, the first step is the advertisement; and, as a great deal depends upon first impressions, the advertising is cleverly calculated to stir to its depths the possible student's yearning for a "profession" that will enable him to earn vastly increased wages while doing what is held up to him as "easy, pleasant work." Big, black letters fairly shout the most enticing (and inaccurate) statements. "Big money is being made by everyone in the automobile business;" "Constant big demand for chauffeurs and repair men such as we teach you to be;" "Be a chauffeur and draw $200 a month;" "Be an auto expert for $15;" "Would you rather work hard for $12 a week, or take life easy, travel, and earn $30 a week;" "Ours is the only gasolene engine university that graduates its students from a real automobile factory;" "The most lucrative trade on earth is auto engineering;" "Get a highly paid position at once;" "Generous salary for easy, agreeable, outdoor work;" "Our graduates always in demand;" "Why be a slave when we can teach you to make money like a gentleman." And so on, until the credulous reader's brain doubtless whirls with visions of a life of ease and plenty. That's the way it looks in the advertisements. But there is another aspect of the matter which perhaps is best indicated by a little story that has the merit of being quite true.

A certain merchant who uses in his business a big gasolene truck required a chauffeur for the machine and advertised for one. Unfortunately he had neglected to read the "auto university" literature, and he therefore didn't know that the automobile business was the best trade in the world; otherwise he doubtless would not have advertised that he was willing to pay the right man $18 per week. And it was hardly to be expected that anyone seeking for "easy, pleasant work" would expect to find it on a truck, to say nothing of such mattters as traveling, short hours and so on. But nevertheless when the merchant reached his office the morning after the appearance of his modest little ad. he had literally to push his way through a crowd of "auto college graduates," diploma holders, mail-instructed experts and a sprinkling of just plain chauffeurs, all of whom displayed a lamentable ignorance of the fact (?) that innumerable easy, well-paid positions were waiting for them. Not quite relishing the task of personally interviewing so many applicants, the merchant opened the door enough to thrust his head through, and explained to the crowd that the job was a hard one, the hours were long, the chauffeur would have to help with the loading and unloading, that the truck was a "brute" and needed a good deal of attention, and that it must be ready for service on time every morning, barring serious trouble. "And," concluded he, "any of you fellows who don't like the prospect had better not waste any more time here." He waited for a moment. One rather flashy-looking individual unostentatiously poked the elevator "down" button and departed—alone. To shorten the yarn, let it be said that the merchant interviewed man after man until he found one who appeared to be a good fit for the job, and engaged him on the spot. But the interviewing process brought out some queer tales. The first man admitted was one of those who had learned by experience. He had no diploma, but he had his hard luck tale and his own opinions.

"These here auto schools," he complained, "is turnin' out so d——d many ginks that can't do nothin' better'n answer a couple o' questions on a paper that they ain't enough jobs to go 'round. They work so cheap that prices is all knocked out an' a good man can't hit a decent job once in a dog's age."

The first man's story was, in essence, the story of all the men who had not taken automobile school courses. But those who had been so "educated" had a wail all of their own, and they all agreed in the substance of it. The theme was that there were so many uneducated men looking for jobs—men who never had had any automobile school work, but had picked up a little knowledge here and there and could just about drive a car as long as it was in good shape—that there was little chance for a real "automobile university" engineer. And then the "engineer" would dig into his breast pocket and produce a diploma with a big red seal—a document that bore evidence of having been so produced many times. When asked to tell of his qualifications for the job the graduate would explain how the boss instructor had given him six road lessons of half an hour each, when he watched the other fellows "shooting trouble" and occasionally took a hand

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himself. Then he would launch forth on a pitifully elementary explanation of how he would proceed in case the motor stopped suddenly on the road. It always was the same. And he was thoroughly competent to drive and care for any kind of a car—of course. But he had not had a regular job as chauffeur, or else he had been only a few days in a position and left because—well, because he didn't like it. And so forth and so on.

This is not a fanciful case, neither is it unique. The cities are crowded with men looking for jobs as chauffeurs, repair men and what not. It is true that there always is room for a first-class man—a man better than the average of his trade—but even such a man as this does not find it an easy matter to locate himself once he gets out of work, for no one can tell merely by talking to a man how good he is, and he has to prove his worth before he can occupy his share of the "plenty of room" that proverbially exists "at the top." Truly, the song that the "auto colleges" sing is a siren song, and many there be that heed it, and while some have had a little experience and know what to expect, and some use their brains, others believe nearly everything they see in print and are undone.

The story of the man who wanted the chauffer—which also is the story of a great many other men who have wanted chauffeurs—goes to show that the average man of little or no education is prone to enumerate his chickens previous to incubation. He believes he can obtain the key to a well-paid "profession" by spending a little money and giving up a little time to study, when he will be in a position to take a leisurely look around, pick out a job that combines the greatest number of points that are advantageous according to his lights, and settle down to enjoy himself and draw his salary. Those are exactly the ideas that a thoughtless, green young fellow would be filled with after a perusal of a batch of advertisements of a certain class of so-called automobile schools, and they are exactly the ideas that they are intended to be filled with. To be sure, these curious hallucinations do not last long; but before they are dispelled the would-be "engineer" has received his "education"—and has paid for it.

Everyone has learned to read sensational advertisements with a good deal of—well, toleration. Reasonable allowance is made for the enthusiasm of the advertisers, and not too much is expected. But even after making the usual deductions some of these technical education advertisements leave so much room for dazzling dreams that it is only natural for many young fellows to make the mistake of imagining that they are going to obtain a great deal for a ridiculously small outlay—something that is directly opposed to all the laws of nature, of physics and of social economy.

Time was when the mere idea of "being a chauffeur and pulling down a fat salary" was enough to keep "classes constantly forming" at the various seats of learning; but multiplication of the founts of wisdom had the natural effect of causing the principals to add other inducements. Naturally the promise of a job after graduation came first, but the obvious impossibility of making such a binding agreement has given way to the more conservative, safer and almost as effective stipulation that graduates will be assisted in obtaining positions, backed by assertions as to the money that is waiting to be picked up in the automobile business, the scarcity of good men and the constant demand for graduates of "our institution" and the like. Road lessons which involve the use of an automobile are indispensable, and here enters a spice of low comedy, for some of the antiquated wrecks rudely aroused from what should have been their last sleep are absolutely side-splitting. Who has not seen an ancient and honorable one-lunger wheezing and rattling along under the burden of a "class" of anywhere from four to ten "students" who stuck on wherever they could get a foothold and watched one of their number learning to drive while the "road instructor" divided his time between showing his pupils how to manipulate a control system long obsolete, and keeping the poor old rattle-trap running, Who has not seen one of these cars stalled, with the "professor," perspiring and profane, trying to get it started once more on its uncertain way, while the grinning "pupils" made a ring around the show and offered facetious advice? These are the occasions when the teacher ceases teaching and the students are at rest.

Of course, there is as much difference between automobile schools and their methods and results as there is between men. A really good automobile school has the same general characteristics as any other school. It will state in explicit terms just what may be expected in the way of education and what the terms are. The fees asked are the fees that are paid—there is none of the elasticity that permits a fee to shrink to an extent that is in exact proportion to the prospective student's reluctance to take the school's course. Examinations are real examinations, diplomas are withheld until earned, and the dropping of students because of their inability to grasp the subjects presented to them is not unheard of. The cars used for road instruction are real cars of current models—cars that will give students an insight into the working of a machine of to-day, rather than of a hoary relic of the past. The instructors really are able men, having thorough technical educations. And so on. From this high standard the schools grade downward till the bottom of the ladder is reached, and at the lowest rung will be found some such thing as a fourth-class repair shop that is called a school so that a few boys can be induced to "enroll" and do rough work on cars in return for "tuition," the idea being, of course, to get help for nothing.

The whole situation is summed up in the familiar saying: "You can't get something for nothing." It is impossible to acquire knowledge without labor—both physical and mental labor, so far as the subject in question is concerned. Competent instructors will not give their services for a pittance, and they naturally are averse to having their reputations as teachers smirched by turning out pupils who are a discredit to them. And as for anything so absolutely ridiculous as making a gasolene motor expert of any man who comes along in the course of eight or ten weeks, or eight or ten months, for that matter, it is only necessary to go to an experienced man who has followed the gasolene motor since its early years, and ask him how long it took him to learn "all about the internal combustion motor." If he is inclined to be a little communicative he will repuly, gravely, "Sonny, I have been working on gasolene motors nearly all my life, and I find that the longer I am at it the more I have to learn."

Easy Way to Replace Valve Springs.

When replacing valve springs a lifter is not necessery, as there is a much quicker and easier method. Insert the spring in a large vise with each end resting against a jaw and compress the spring by screwing up the jaws, leaving enough of the spring above the top of the jaws for a string or wire to pass through the center of said spring. When compressed so that the coils of the spring are touching, tie it in two places with string. After it is tied it is taken from the vise and put in place on the engine and the washer or pin or whatever is used can be inserted and the strings cut. There are those who advocate using copper wire instead of string, but the wire is apt to catch in the spring and affects its proper operation, while string will work itself out in short time if it does not come out readily when cut, and will not affect its working in any way.

Little Things That Choke Carburetters.

Just because there is a "separator" in the gasolene line it is not always safe to conclude that there is no possibility of getting the spray nozzle choked or the line blocked. Sometimes, particularly in a new machine, a great deal of fine matter can get through and cause trouble at the carburetter, and it is by no means a rare thing for a little scrap of waste or rag, or a shaving, or a pellet of solder to interfere with the flow of gasolene sufficiently to starve the motor.

"Prying Up" Renders Valve Stems Useless.

Not a few valve stems are bent, and the whole valve thus made useless, by carlessness in prying up the spring in order to remove the pin so as to release the spring when the valve is to be removed. While it is not always possible to have proper valve removing tools when they are needed, it is entirely possible to be careful and not bend the stems, which are rather soft and easily distorted.

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CASTOR OIL THAT FAILS AS AN ENGINE LUBRICANT

Explanation of the Reason for Its Value as a Lubricant for Rotating-Cylinder Engines That Makes Plain the Impracticability of Its Employment for Automobile Engines—Analyses Conducted by a Painstaking Chemist and the Results Obtained.

Whatever may be the value of castor oil in other fields it has little practical value for internal combustion engines of the fixed cylinder type such as commonly are used in motor cars. At least, such is the opinion of a British chemist, rendered after exhaustive tests to determine the physical properties of the oil as compared with straight mineral oils, and its behavior in use.

Though little if any attention has been directed toward the possibilities of castor oil as a lubricant in America, foreign motorists have for some time debated the advisability of "changing over" to it. As a matter of fact, not a few of them already have done so, and although the results obtained have not been such as to set the world afire they have not been altogether unsatisfactory, and the very diversity of opinions which prevail emphasizes the timeliness of the tests. It is doubtful if the tendency toward the more general use of castor oil as a lubricant can have been fostered by hopes of "reduced cost of running." At the present market price, castor oil such as is regularly supplied by a noted firm of New York druggists especially for lubricating fine machinery lists at 11 cents a pound in five-gallon lots, which figures out at the rate of approximately 90 cents a gallon. Comparing this figure with the average cost of the best quality mineral oils, which is 75 cents a gallon, the difference becomes apparent. It is more probable that the apparently increasing popularity of castor oil abroad is due to the success which has attended its use in aeronautical engines of the rotating cylinder type. However, such engines operate under vastly different conditions than do fixed cylinder engines, all of which is expounded by a writer in the Autocar, who states that though castor oil undoubtedly is an "excellent lubricant" it must be "used with discretion" in an internal combustion engine.

The conclusions of the writer are based in part on the results of tests made at the factory of Messrs. Clement-Talbot, in which a number of mineral oils, and incidentally castor oil, were used under the same conditions, a car being run in each case 1,000 miles. After each test the engine was taken down to ascertain its condition with regard to efficiency of lubrication and the amount of carbon deposit which had accumulated, the report of the engineer who examined the engine after the test with castor oil being as follows:

"'After this test, all four pistons looked very much alike; each one had a thick hard, shiny and fairly smooth deposit on top and very little on the sides. All the rings were quite free and well lubricated. The cylinder heads had a thin, hard deposit all over, and the valve caps had more deposit than with any other oil. The valve pockets also contained an exceptional amount of carbon.'"

In commenting on the report and leading up to his conclusions on the value of castor oil, the writer says: "This short report gives the impression that castor oil leaves perhaps an exceptional amount of 'carbon deposit' as compared with other oils, and this is emphasized by the actual weights of the deposit, which are given herewith. The cylinders were very carefully withdrawn, and a special slotted tray was fitted around the connecting rods under each piston in turn. The whole of the deposit was carefully scraped into the tray and removed with a camel's hair brush into a receptacle to be weighed. The deposit from each piston was weighed separately, but in the following figures the total weight on the four pistons is given for the castor oil (C)—which was the very finest quality obtainable; for pure mineral oils (A, B and F), prepared from the highest class crude, but differing chiefly in viscosity, and for mineral oils (H, G), prepared from an inferior crude. The relative viscosities are placed against each:

	Relative viscosities at 140° F.	Total weight of deposit on pistons. Grammes.
A. Pure mineral oil.....	1.0	5.12
B. Pure mineral oil.....	1.5	6.57
F. Pure mineral oil.....	2.3	9.54
H. Inferior mineral oil..	1.1	8.32
G. Inferior mineral oil...	2.2	13.55
C. Castor oil.....	4.4	14.08

"From this it will be seen that the 'carbon deposit' is greater with castor oil than with a low grade heavy-bodied mineral oil as G.

"In my opinion castor oil can be only used in fixed cylinders with impunity for short distances, and then with repeated cleanings between runs, but on rotary engines of the Gnome type cleaning is almost unnecessary. The reason is that one cannot consistently use castor oil over and over again, for the fact is indisputable that it has a far greater tendency than mineral oils to absorb oxygen, and so gradually to increase in body and finally to gum. When once it commences to gum the carbonization becomes more rapid, because the thickened and pitch-like oil acts as an insulating covering on the top of the pistons and of the cylinder, and cannot get away with sufficient rapidity to avoid decomposition and baking to a coke. Therefore if castor oil is to be used on the ordinary stationary cylinder type of engine, it is necessary to wash out the crank chamber and to replace with fresh oil at frequent intervals.

"On a rotary engine such as the Gnome this cleaning is unnecessary, because there is a continuous stream of fresh castor oil brought into the crank chambers and then thrown by centrifugal force past the pistons and through the cylinder into the exhaust. Thus the stream of oil never has sufficient time to oxidize fully, gum or decompose. This action of centrifugal force accounts for the large consumption of oil on the rotary engine, and also for the fact that the pistons and cylinders keep comparatively clean. It is noticeable in this connection that the castor oil from the exhaust of a rotary engine is pale yellow in color, and shows practically no sign of change from its original condition, whereas castor oil which has run some few hundred miles in the crank chamber of ordinary non-rotary type engine is almost black, and considerably more viscous than new oil. It will also be found to have undergone considerable chemical change; its specific gravity will have increased, and its iodine value decreased. This combination indicates that oxidation or gumming has occurred.

"In thus criticising the use of castor oil I do not wish it to be inferred that it is not an excellent lubricant. What I wish to suggest is that in the case of an internal combustion engine it must be used with discretion. A point in favor of castor oil is the fact that it maintains its viscosity in a remarkable manner at high temperatures, and that at those high temperatures it has a peculiar creeping or capillary action which enables it to spread uniformly over the whole of the metallic surfaces, whereas under the same conditions a similarly bodied mineral oil would be unevenly distributed in patches. Another point is that the specific heat of castor oil is considerably higher than that of a pure mineral oil. This is in its favor, insomuch that it shows castor oil to be a better heat remover than a mineral oil.

"Motorists and aviators have from time to time informed me that they are using castor oil, but have apparently been under

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some misapprehension. I find that they have been using a brand of prepared oil under the impression that it is a specially refined castor oil, or that it is a blend of castor oil with a pure hydrocarbon oil, in which blend the office of the hydrocarbon oil is supposed by them to be one of protecting the particles of castor oil from oxidation. This ingenious idea, however, would not appeal to a physicist or chemist.

"Some time ago, being myself under the impression that this particular brand of oil, on account of its name, had some kind of relationship to castor oil, I purchased samples A, B and C from the ordinary sources and analyzed them. I found them one and all to be simply refined mineral oils, free from any traces of castor oil. Below I give some of the tests of these brands, as compared with castor oil:

	A.	B.	C.	Cold drawn castor oil.
Viscosity at 70° F.	1,080	1,530	2,340	3,810
Ditto at 140° F.	129	147	198	370
Ditto at 200° F.	55	55	64	88
Flash point, open	405° F.	371° F.*	475° F.	480° F.
Ditto, closed	396° F.	364° F.	460° F.	460° F.
Saponifiable matter	0.24%	0.27%	0.28%	99.74%
Unsaponifiable matter	99.76%	99.73%	99.72%	0.26%
Iodine values	17	11.4	20.4	83

*This extremely low figure for flash point caused me to repeat the test three times, and the resluts in each case were found to be the same.

"For the benefit of those readers who do not understand the term 'saponifiable,' I would say briefly that the property of being saponifiable is the one which essentially separates mineral oils from fatty oils, i. e., from oils of animal and vegetable origin. An oil to resist saponification must resist the action of an alkali such as soda or potash. Fatty oils do not resist such action, but are split up, yielding glycerin and a soap. Mineral oils, on the other hand, might for all practical purposes be called 'unsaponifiable,' and are generally only affected by the action of alkalis to the extent of 1 per cent. or less.

"The iodine value of an oil may generally be taken as an indication of the extent of its 'unsaturation,' or perhaps one might say more simply that it is an indication of the amount of oxygen which that oil is capable of absorbing. It may be taken as a universal rule, to which there is only one exception (which is not castor oil), that commercial fatty oils have iodine values between 25 and 205, while mineral oils vary from 4 to 21, according to their state of purity and their origin. The more pure and highly refined a mineral oil is the less will be its iodine value.

"In conclusion, I would call attention to the essential difference which exists between mineral oils and castor oil in the chemical tests, i. e., saponification and iodine values as distinct from physical tests. for, although it is possible to manufacture mineral oils having the same viscosity and specific gravity as castor oil at given temperatures, yet it is quite impossible to imitate saponification and iodine values."

OFFENSIVENESS OF EXHAUST GASES

Analysis Proves That With Carburetters Properly Adjusted it is Inconsequential—Two Samples "Dissected."

Looking at the matter from an ordinary, everyday point of view, there is not much reason for becoming too well acquainted with the exhaust gases from a gasolene motor; in fact, a distance usually is desirable. Taking the scientific view, however, entirely changes the aspect of the case, and when a chemist goes to extremes and picks apart, bit by bit, a sample of exhaust gas, measures, weighs and labels each particle and gives the character and pedigree of each, the thing becomes interesting.

In the first place, the chemist looks upon gasolene with a suspicious eye, and upon examination finds that it is by no means the simple stuff it appears to be. It really is made up of a complex assortment of hydrocarbons containing varying quantities of hydrogen and carbon. Vaporize this mixture, mix it thoroughly with just the right quantity of air and burn it and the result is carbon dioxide and water; the latter quite naturally takes the form of steam. If there is not sufficient air—that is, if the mixture is too rich—carbon monoxide is produced, and while this poisonous gas is odorless, it is accompanied by decomposed but unburned hydrocarbons which have a fearful smell.

As for the atmosphere which forms such an important part of the explosive mixture, only about one-fifth of it is of any real use, so far as combustion is concerned. This fifth is oxygen, and the other four-fifths or thereabouts are nitrogen, which is chiefly remarkable, in this connection, for its negative qualities. It does not burn; it does not assist the other gases in burning; it has no odor; it does not change in any way during the process of combustion—in fact, it is an inert dilutant, and it issues from the exhaust pipe in the same form and volume a swhen it entered the carburetter.

All this by way of leading up to the actual chemical analysis, which looks so dryly scientific that it seems as though something really ought to be said to liven it up a little. A six-cylinder gasolene motor was carefully adjusted as to its carburetter and run at its normal speed until it was warmed up to its regular working temperature. Then two samples of the gases were taken, sample A at a point 28 inches from the exhaust port of the motor and sample B 35 inches from the port. After the chemist finished his work all that remained of the gases were the following tables:

Sample	A	B
Carbonic acid gas	8.70	8.15
Oxygen	2.75	3.50
Carbon monoxide	.30	.95
Hydrocarbons	6.55	5.70
Nitrogen	81.70	81.70
Total	100.00	100.00

In looking over these analyses the first thing the chemist has to do is to explain the fact that he seems to have failed to find any water, though certainly water, in chemical combination, went into the cylinders. The explanation is that the water really forms a very insignificant part of the mixture, and though in the form of steam it made quite a considerable showing, when cooled it probably was deposited on the walls of the vessels containing the gas as an imperceptible dampness. The nitrogen content is the same in both samples, forming a very large proportion of the whole.

The differences in the gases shown by the figures resulting from the analysis of the two samples permit some interesting deductions. For instance, it is noticeable that in sample A, which was the one taken nearer the motor, there are unburned hydrocarbons to the amount of 6.55 per cent., while in the sample taken further along the pipe the quantity dwindles to 5.70 per cent. The explanation evidently is that the gases still were burning as they passed through the pipe, so that less unburned hydrocarbon remained when B was taken than when A was taken. The theory of continued combustion would suggest that sample B would show an increase in the amount of carbon dioxide—which is another name for carbonic acid gas—in proportion to the difference in the volume of unburned hydrocarbons in the two samples. But such is not the case and the chemist again has to explain. His theory is that deposits of hot carbon in the pipes, or particles of hot carbon in suspension in the gas, would have a tendency to reduce the carbon dioxide to carbon monoxide.

There would seem to be no real excuse for the increase of oxygen shown in sample B over sample A, and the chemist has to fall back on something that his books do not tell him. The idea is that there probably existed some small leak which permitted a little extra oxygen to be mingled with the sample. There is no chemical explanation.

The samples show less than 7 per cent. of gases that can be classed as evil-smelling, and though this is not entirely perfect combustion it is very good indeed. If no motor ever did worse there never would be any fuss about the motor car as an olfactory nuisance.

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1,001,950. Carburetter. Thomas J. Hart, Jewettville, N. Y., assignor to Sherwood Manufacturing Company, Buffalo, N. Y., a Corporation of New York. Filed Nov. 26, 1909. Serial No. 529,854.

1. A carburetter comprising a mixing tube provided with a plurality of spiral partitions which divide the same into a plurality of spiral longitudinal mixing passages, and means for supplying air and gasoline to said passages.

1,003,949. Signal Lamp for Vehicles. Almor M. Puckett, San Antonio, Tex. Original application filed Dec. 1, 1910, Serial No. 595,146. Divided and this application filed May 25, 1911. Serial No. 629,429.

A lamp comprising a body, a reflector arranged therein, a sign holding box having an open side disposed opposite said reflector, and light conducting tubes extending from the body at right angles to each other and arranged in the same horizontal plane, said tubes being disposed below said box and one of them arranged opposite said reflector.

1,003,963. Motor Vehicle. Russell Huff. Detroit, Mich., assignor, by mesne assignments, to Packard Motor Car Company, Detroit, Mich., a Corporation of Michigan. Original application filed June 27, 1908, Serial No. 440,699. Divided and this application filed Oct. 12, 1910. Serial No. 586,749.

1. In a device of the class described, the combination with a crank case having a laterally extending arm, of a magneto shaft mounted in bearings in said arm, a member of a universal coupling on the end of said shaft, a flange on said member, and a pulley secured to said flange.

2. In a device of the class described, the combination with the crank case having a laterally extending arm, of a magneto shaft mounted in bearings on said arm, an armature shaft for the magneto in line with said shaft, a universal coupling joining the ends of said shafts, a flange on the member of the universal coupling on the magneto shaft, and a pulley having its web bolted to said flange.

1,004,582. Tire for Vehicle Wheels. William D. McNaull, Toledo, Ohio. Filed Jan. 28, 1911. Serial No. 605,143.

1. In a device of the described character, a demountable rim comprising a metal ring having a deep peripheral circumferential channel, tire engaging members upon the opposite margins of the channel and providing opposed circumferential grooves, combined with a flexible tread member having beaded margins which fit into said circumferential grooves, and an inner pneumatic tube the inflation of which forces the beaded margins of the tread member into engagement with said circumferential grooves, the transverse horizontal width of the recess formed by the channel of the rim and its tire engaging members being greater than the width of the tread member when distended, and of such depth as to contain the tread member and, when deflated, the pneumatic tube

1,004,598. Support for Speedometer Gearing. Albert L. Soper, Cleveland, Ohio, assignor to Warner Instrument Company, Beloit, Wis., a Corporation of Illinois. Filed May 5, 1910. Serial No. 559,557.

1. In combination with a vehicle wheel and steering knuckle having a vertical portion supporting the wheel and a pair of steering arms, a gear carried by the wheel, means for transmitting movement from said gear to a measuring device comprising a transmitting gear which meshes with said gear, means for holding the transmitting gear in proper position relative to the gear which it engages comprising a member in addition to the steering arms projecting from the vertical portion of the knuckle, and a supporting device for said transmitting gear clamped to the extreme end of said member.

1,004,626. Tire for Vehicles. Michael J. Cantor and Ernest Siegel, New York, N. Y. Filed Apr. 7, 1911. Serial No. 619,497.

1. A vehicle wheel comprising a felly provided with dove-tailed recesses, an outer concentric rim also provided with dovetailed recesses registering with those of the felly, double dove-tailed resilient members each adapted to fit into an opposed pair of such recesses and retaining members each also adapted to fit in the same pair of recesses to limit the relative movement of the felly and the outer rim.

1,004,628. Headlight or Other Light-Projector. William Churchill, Corning, N. Y., assignor to Corning Glass Works, Corning, N. Y. Filed Sept. 14, 1910. Serial No. 582,082.

1. In a headlight or other light projector, the combination with a casing and a lamp of a lens of the Fresnel type and an outwardly flaring and reflecting hood, the inner edge of which meets and surrounds the operative face of the lens, the angle of the reflecting surface of the hood being such that the rays projected from the source of light through the miters of the lens, and caused to diverge away from the axis of the beam, shall be caught and reflected by said surface so that they shall proceed in an approximately parallel beam, thus reinforcing the strength of the beam projected by the lens, substantially as set forth.

1,004,639. Pneumatic Tire Rim. Sylvester Cline Force, San Francisco, Cal. Filed Jan. 6, 1910. Serial No. 536,643.

In a pneumatic tire holding rim, a wheel, a felly therefor, a rim around said felly, said rim having one portion thereof beveled and having a tire holding flange and another flange in contact with the felly, a removable flanged ring adapted to fit the beveled portion of the previously mentioned rim and having a tire holding flange and a flange in contact with said felly, bolts passing through the flanges in contact with the felly, flanged nuts to secure the removable ring and beveled rim in place on the felly, and lugs carried by the removable ring to project over the flanged nuts, substantially as described

1,004,655. Wheel. Simon P. Johnson, Westpoint, Neb. Filed May 27, 1911. Serial No. 926,846.

1. In a wheel, the combination with a hub, a wheel rim comprising a pair of laterally spaced annular members, and spokes connecting the members of said rim with each other and with said hub, of a supplemental wheel rim that is transversely severed and detachably seated on the members of the first noted wheel rim and spanning the opening therebetween, means for anchoring one of the severed ends of said supplemental wheel rim, and an anchored draw bolt secured to said supplemental wheel rim in the vicinity of its other severed end, for drawing said supplemental wheel rim on the first noted wheel rim, substantially as described.

1,004,658. Spring Tire. Joseph M. Keller, Philadelphia, Pa. Filed Nov, 21, 1910. Serial No. 593,317.

1. A tire tube, comprising two strips of spring metal having oppositely disposed convolutions crossing each other, said strips spaced apart, each strip proportionately widest at regular intervals, proportionately narrowest at equal distances between the widest portions, the outer edges of said strips having a compound curvature, rings located at opposite sides of the tube, and elastic connecting devices inside of the tube projecting through the tube and rings, and securing devices against the outer faces of said rings holding said elastic devices, substantially as described.

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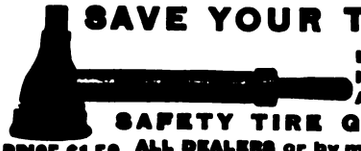


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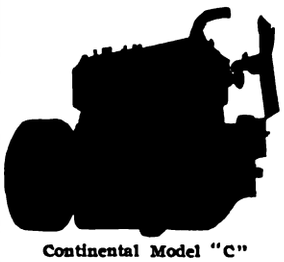


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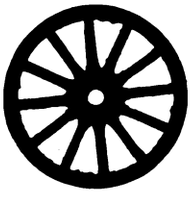


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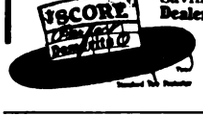
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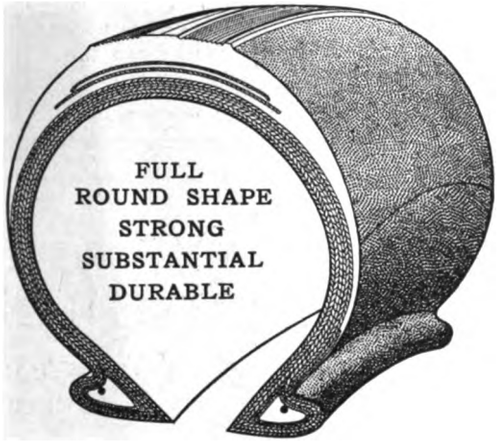
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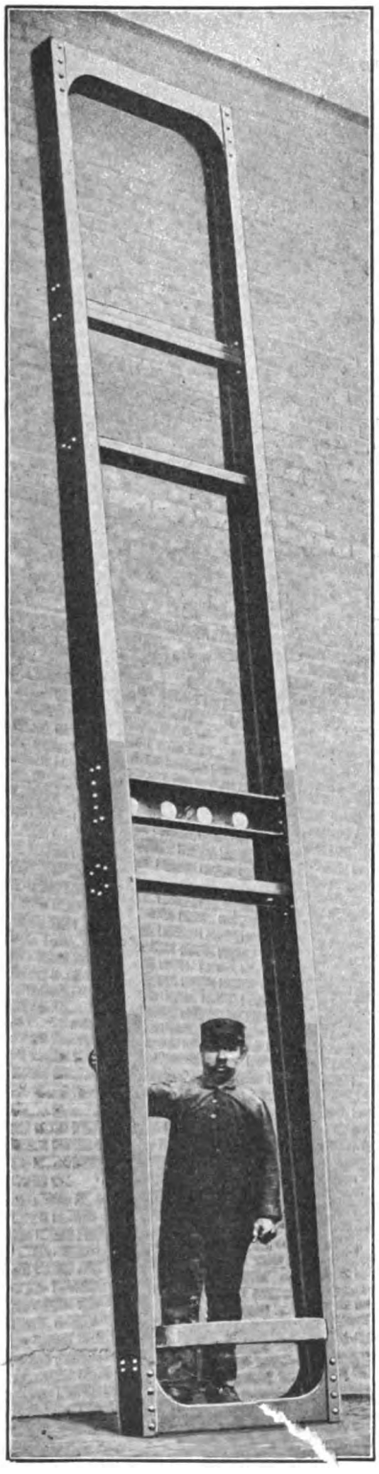
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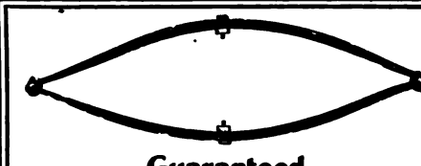
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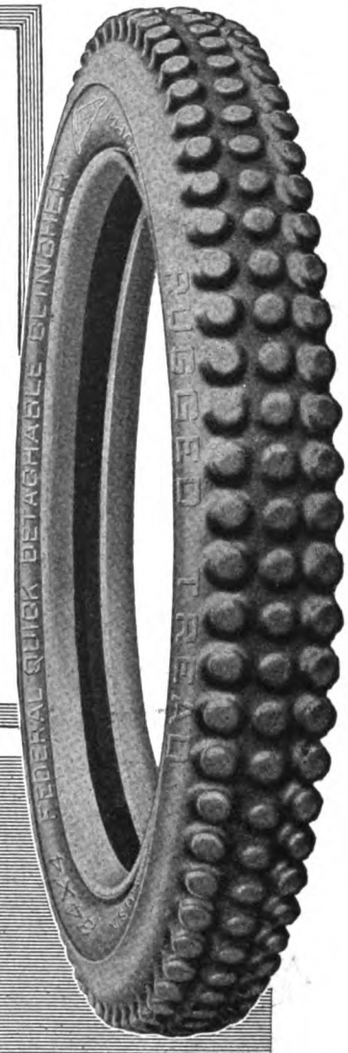
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The heavy, expanding base knobs grip the road with wonderful tenacity and give the greatest traction under all road conditions. The knobs are shaped so they offer a myriad of skid-resisting angles the full width of the tread at the point of road contact. Users of tires appreciate the advantages afforded by this *real* non-skid tire.

Ask any Federal tire dealer to show you the Rugged Tread—no argument will be necessary — its features will be obvious on examination.

We will be pleased to send further information on request.



Rugged Tread

Round Tread



FEDERAL TIRES

A quality tire of "Extra Service"

The Federal Round Tread Tire is a tire that gives the limit in mileage and motorists look upon it as the tire of *"Extra Service."* Its extreme durability is due to the fact that it is made of the highest grade materials by the most skilled workmen. It is a tire of unusual quality—the *extra* mileage is built into it.

Federal Tires are made to fit all standard rims and are procurable through leading dealers and auto supply houses everywhere—an interesting tire book mailed on request.

Federal Rubber Manufacturing Co.
MILWAUKEE

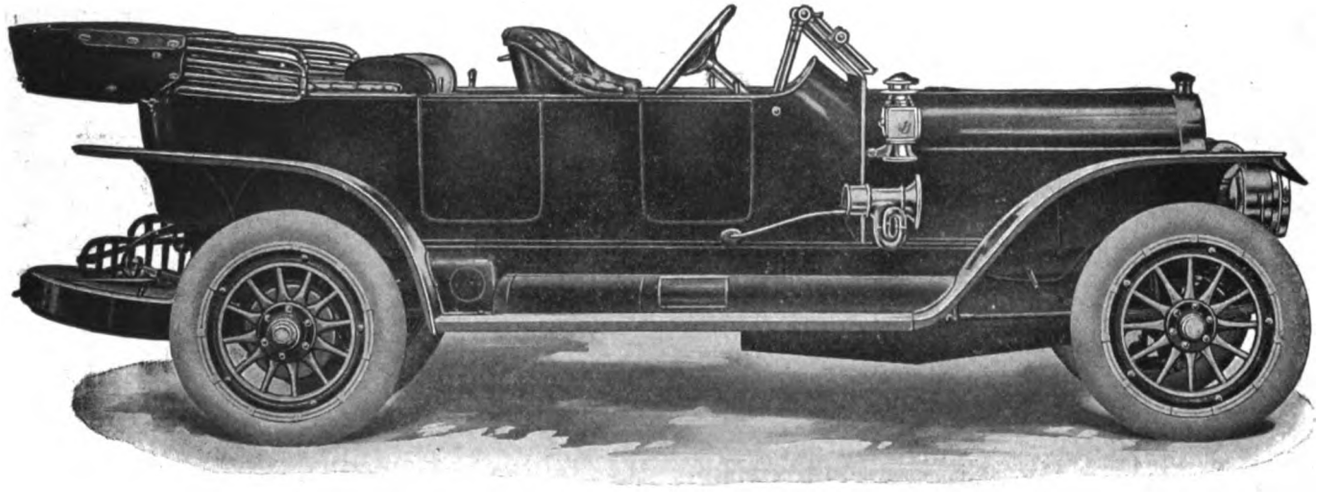
Branches and Agencies
New York, Boston, Chicago, Kansas City, Denver, Atlanta, Los Angeles, Pasadena, San Diego, Portland Louisville, Indianapolis

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Knox

AND

Absolute Motor Satisfaction Are Synonymous



Knox Model "S" 6-Cylinder Torpedo

"Passes Them All"

On the road	Up the hill
In flexibility	In silence
In power	In speed
In equipment	In finish

Send for Catalog

Ask for a Demonstration

KNOX AUTOMOBILE CO., Springfield, Mass.

BRANCHES: New York, Chicago

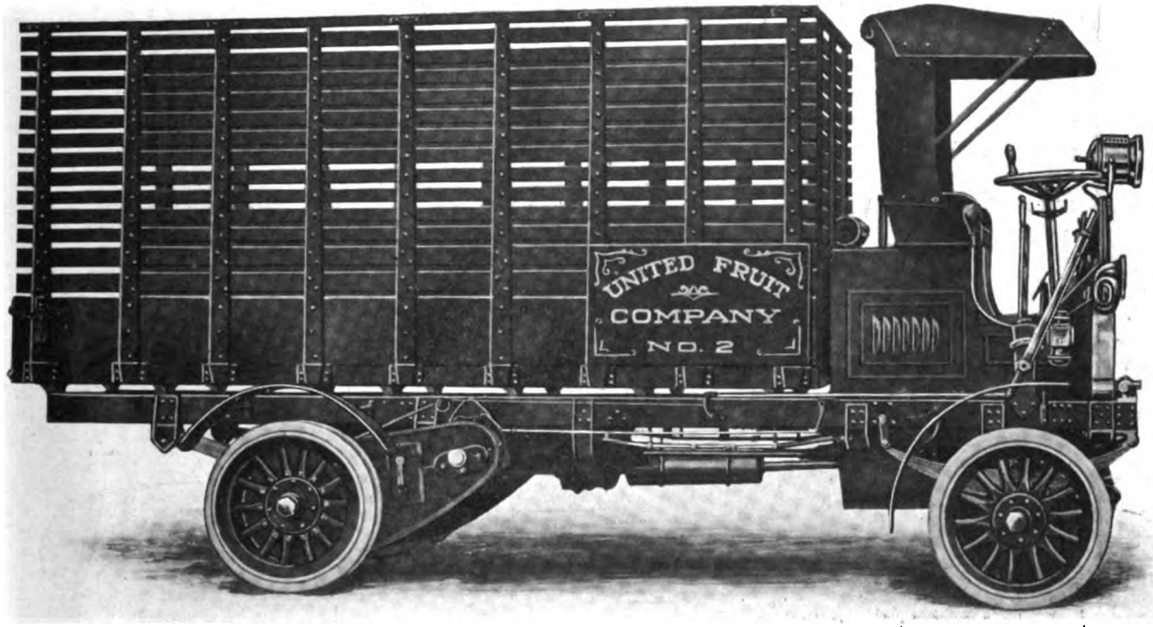
"All Knox Pleasure Cars Are Sold Completely Equipped"

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Knox

Commercial Vehicles

have been recognized as the highest standard of motor truck design and construction ever since the beginning of the industry.



They have formed the basis of comparison and imitation for the small army of concerns who have put motor trucks on the market in recent years.

WHY? There is but one reason. They have stood the test of service in practically every field of industrial transportation.

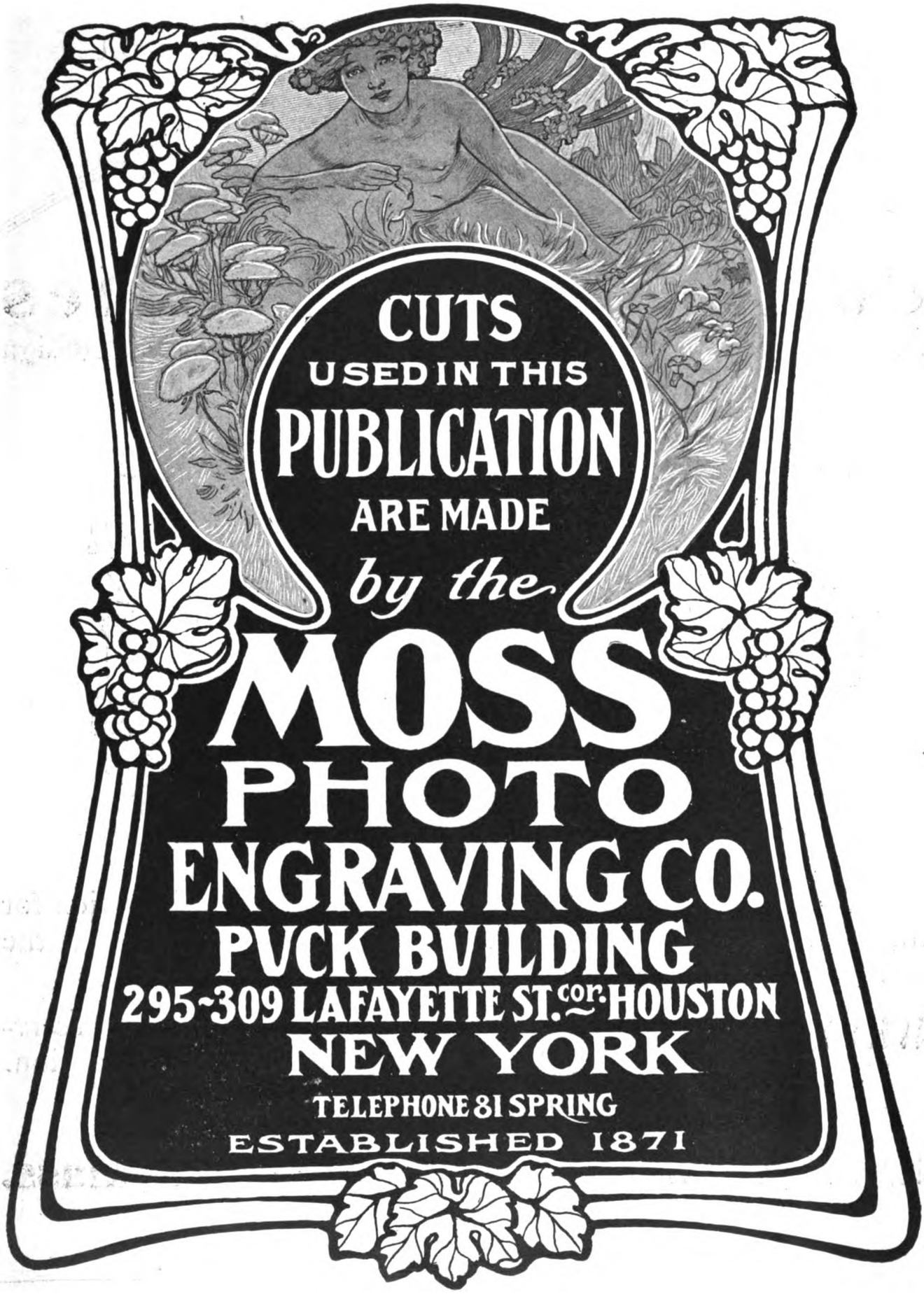
They Have Made Good

KNOX AUTOMOBILE CO., Springfield, Mass.

BRANCHES: New York, Chicago

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Service

KisselKar service is nation-wide. Included in the KisselKar service organization are especially constructed and equipped service buildings at principal points of America. These are service branches of the Kissel Motor Car Company, bringing every KisselKar owner into close relationship with the manufacturers to whom **service to owners** is an important policy.

These branches carry a full stock of parts of every KisselKar model ever built, so the shaking loose and loss of minor parts, or even serious breakages through accidents, do not involve long waits for replacements. KisselKar Service takes care of you wherever you are.

Here is a Partial List of KisselKar Service Branches and Sales Agencies.

Boston, New York, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Chicago, Milwaukee, Kansas City, Omaha, Butte, Denver, San Francisco, Los Angeles, Seattle, Portland, Minneapolis, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

KISSELKAR

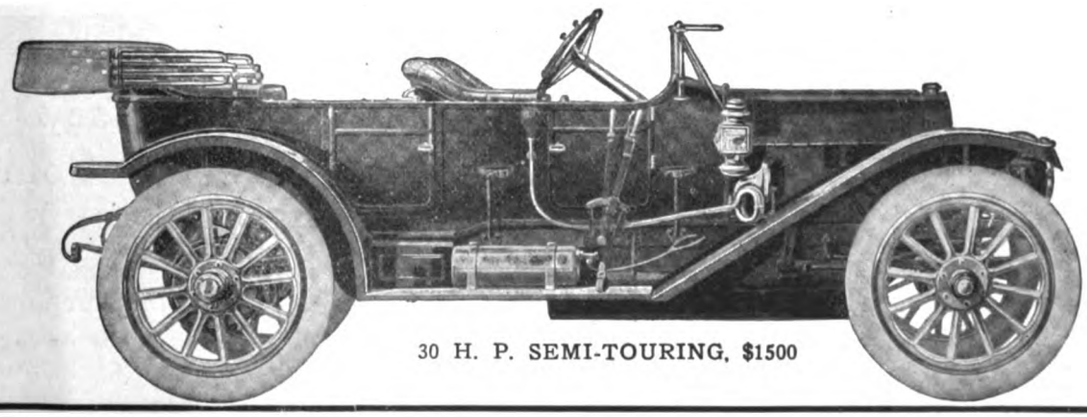
30 — $1500
40 — 1850
50 — 2000
60 H. P. "Six" — $3000

KisselKar prices, except on the "Thirty," include full equipment—top, glass front, demountable rims, speedometer, etc.—everything needed for a perfectly dressed car. The "Thirty" has more than regular equipment.

Write for KisselKar catalog, illustrating and describing the KisselKar line of pleasure models, and commercial vehicles. It is one of the most comprehensive books ever published.

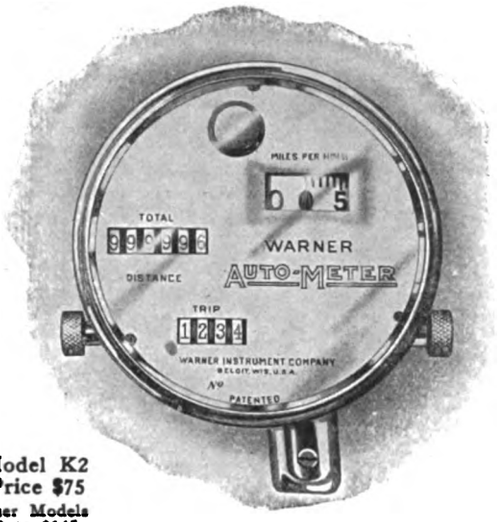
KISSEL MOTOR CAR CO., 159 Kissel Ave., Hartford, Wis.

Every Inch a Car



30 H. P. SEMI-TOURING, $1500

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Model K2
Price $75
Other Models $50 to $145.

WARNER
AUTO-METER

"The Aristocrat of Speed Indicators"

THE man who **takes pride in his car** is the one who appreciates the Warner most. He would never disgrace it with anything cheap, inferior and unreliable.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

Branches at

Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
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THE MOTOR WORLD

offers a market place for dealers and manufacturers who have something to sell or something to buy—more particularly among themselves. This market place is found in the

Classified Advertising Section

a department consulted and used by a large proportion of the trade. Look it over on pages 53 and 54. Then look over your dead stock and if you have anything to buy, sell, or exchange, send us the advertisement—we'll do the rest.

The Motor World Publishing Company
1600 Broadway NEW YORK

Ford
THE UNIVERSAL CAR

At 6's and 7's the world is sure to be—to him who has not learned to center his effort. We will make—and sell—seventy-five thousand Ford cars this year—because we have concentrated our energies upon the building of one—and only one—good car.

And today there is no other car like the Ford Model T. It's lightest, rightest—most economical. The two-passenger car costs but $590, f. o. b., Detroit, complete with all equipment, the five passenger but $690. Today get Catalogue 101—from The Ford Motor Company, Detroit, Mich.

K·D

The Motor With the Sliding Crescent Valve
KNIGHT-DAVIDSON
1896 — 1912

The **CRESCENT valve** of the **K-D Motor**, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The **K-D motor** is **simple, silent, cools rapidly**, has the **simplest** oiling system known, will not **carbonize.** Last and most important, will give on a given quantity of fuel more **power, speed** and **endurance**, unit for unit, than any other engine on any type of an automobile. We want to present some **facts** to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

The Kinsey Manufacturing Company
TOLEDO, OHIO

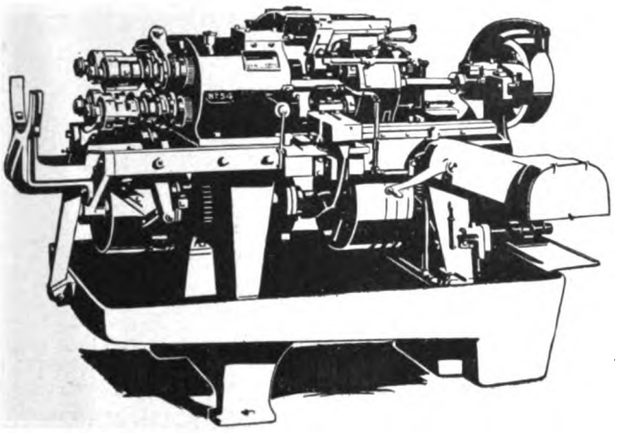
Manufacturers of Auto Parts, Kinwood Radiators, Fenders, Kinwood Oilers, Gaskets, Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

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QUANTITY and QUALITY

On The Acme Automatic Multiple Spindle Screw Machine



THE quality of parts used by the Automobile trade must be excellent in order to stand the test.

We have placed in the plants of the largest Auto manufacturers in the world, Acme Automatics, which are not only helping to give the manufacturers a fair profit, but are partly responsible for standardizing of high grade equipment.

The simultaneous use of as many as eight tools is the principle which stands for both quality and quantity in this screw machine.

When especially fine diameters are required the method provides for the setting of a special tool in one of the eight positions for shaving, reaming, etc. These extra operations, which can be applied without loss of time, are what make this machine preferable to consumers.

May we prove quality and low cost on your work?

Booklet ?

The National-Acme Manufacturing Company
CLEVELAND (Sixth City)

New York Chicago Boston Detroit Atlanta Montreal
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PITTSFIELD

High Tension Magneto

Press the Button—Your Car Starts

THE REMARKABLE freedom from breakdowns, due to its unique design, has brought the Pittsfield true high tension magneto into extraordinary popularity among motorists

It has no moving wires on the armature, the coil being stationary in the rear of the magneto and watertight. Not only is the retarded spark as efficient as the advanced, but our latest design is operated by a Self-starting Switch that makes cranking unnecessary.

Equip your car with our Type N-B and it will start easier, run better and take steeper hills on high gear than ever before.

PITTSFIELD SPARK COIL CO., Dalton, Mass.

SALES REPRESENTATIVES—*New England States, Williiam J. Connell, 555 Boylston St., Boston, Mass. Atlantic States, Thomas J. Wetzel, 17 W. 42nd St., New York City. *Central States, Brown & Caine, 1517 Michigan Ave., Chicago, Ill. *Pacific States, Chanslor & Lyon Motor Supply Co., San Francisco, Los Angeles and Fresno, Cal., Seattle and Spokane, Wash., Portland, Ore. *Canada, Russell Motor Car Co., West Toronto, Canada.
*Full line carried.

Catalog of the Famous Pittsfield Ignition Specialties on Request.



TYPE N-B

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The Lightest, Practical Rim Made



It Is Not Enough to Specify Demountable Rims For Your New Car—Insist Upon

"Firestone"

Quick Detachable

Demountable Rims

Built from the Tiremaker's Standpoint and Experience

Look into the past records of demountable rims; see how long any one of them has withstood the test of time; find out from users which one is most practical and dependable in **actual service.**

We have no doubt as to your decision. Other rims have come and gone, while the Firestone has steadily gained in leadership. You will choose the Firestone—

Because the Firestone rim has a **continuous** bearing-support all around the wheel. The Firestone rim has no wedges placed here and there to force it out of round.

Because the Firestone rim has a "no-split" or unbroken base that makes it water-tight—keeps moisture from working through and decaying the tire.

Because the design of the Firestone rim does away with all complications and delicate adjustments, absolutely preventing rusting together of parts, ensuring reliability and ease of operation, and requiring no special tool to operate.

Because the Firestone quick detachable feature enables you to change inner tubes when rim is on the wheel as well as off it. Think what that means when overtaken by repeated punctures.

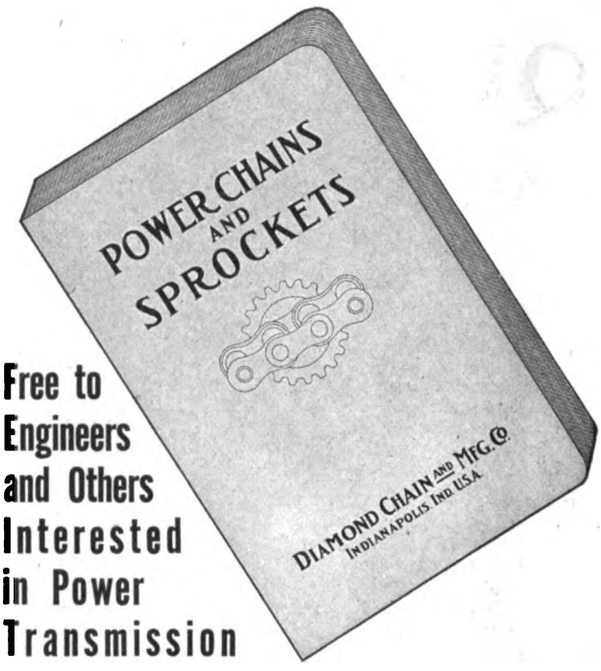
Because several years of success have refined Firestone rims to the lightest weight consistent with safety and practicability.

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"America's Largest Exclusive Tire and Rim Makers"

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A TREATISE by L. M. WAINWRIGHT.



This 96 page profusely illustrated book contains important engineering data and information concerning block and roller power transmission chains never before published. Comparisons with belting, gearing, cast chain, advice on uses for which machine made chain is best suited, motor vehicle drives, design and installation of chains and sprockets, care of chains, running drives in oil, etc., covering every phase of chain driving, make it a book of reference equally valuable to engineer, designer and shop manager.

Write today for a copy of the first edition. It may contain a suggestion in line with your immediate requirements.

TRADE ◇ MARK

DIAMOND CHAIN & MFG. CO.

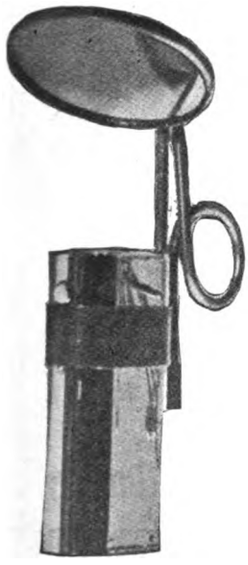
150 W. Georgia St., Indianapolis, Ind.

CAPACITY 8,000,000 FEET PER YEAR

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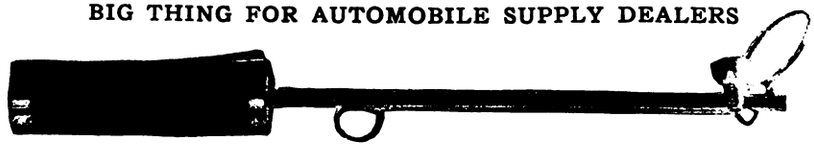
The Reflex



An Inspection Light That Locates Trouble with the Least Trouble

MOTORISTS who have learned the trials and inconvenience of **crawling under** the body of the car to locate trouble will gladly welcome the advent of the "REFLEX"—the Inspection Light that will reach into the innermost recesses of the Motor, etc., and show, clearly, all sides of the object at one glance. It gives a powerful light without danger of explosion, without smoke or soot. It has done away with the dangerous match and candle. Can't blow out; costs little more than the ordinary pocket flash light. Our circulars and price lists will be mailed on request.

BIG THING FOR AUTOMOBILE SUPPLY DEALERS



REFLEX INSPECTION LIGHT SALES COMPANY

SOLE SALE RIGHTS FOR UNITED STATES

35-37 S. Third Avenue **Mount Vernon, N. Y.**

THINK THIS OVER very carefully and read it twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly—tuned up to its highest power. Perhaps the valves pit—warp—go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

You cannot slight this part by putting in an inferior product—valves that will give trouble, or even break from inexperience in their manufacture—valves of unsuitable material, not suitably heat treated.

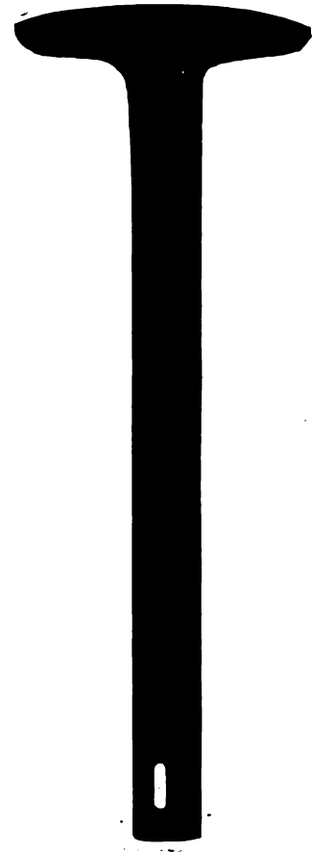
Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

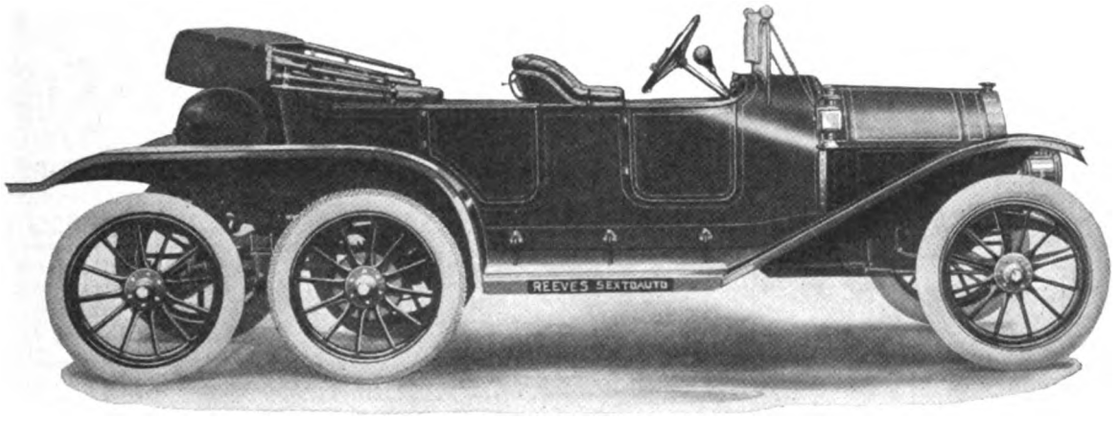
THE ELECTRIC WELDING PRODUCTS COMPANY

CLEVELAND, OHIO



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The Reeves "Sextoauto"



The Octoauto's Sister

NO SHOCK NO JOLT **Rides Like a Pullman Palace Car** **NO BOUNCE NO REBOUND**

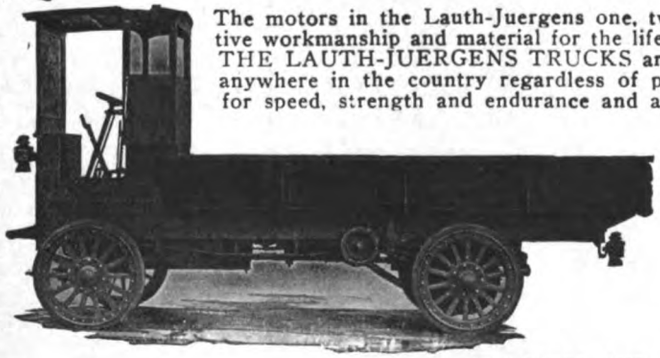
An old and accepted principle to accomplish easy riding applied to the automobile. Not a single experiment embodied in the whole car. It's a phenomenal car, and bound to revolutionize automobile construction where comfort in riding is a consideration. Tire trouble and expense actually reduced. For full information, description and price, address,

REEVES SEXTO-OCTO COMPANY, Columbus, Indiana

Lauth-Juergens

ONE, TWO AND THREE TON TRUCKS

Guaranteed for Life



The motors in the Lauth-Juergens one, two and three-ton trucks are guaranteed against defective workmanship and material for the life of the truck—CAN YOU ASK MORE? THE LAUTH-JUERGENS TRUCKS are the latest and most powerful built trucks to be had anywhere in the country regardless of price or make. They hold an unquestionable reputation for speed, strength and endurance and are built for years of hard service. They are constructed of the best materials obtainable, bear the finest workmanship the world affords and are manufactured in our own shops—TRANSMISSION, JACK SHAFT, CLUTCH, GEARS AND ALL. That's why Lauth-Juergens trucks are real delivery insurance. Send for complete specifications and our 1912 catalogue telling the story of another great success in motor truck building. Reliable agents should communicate with us at once for 1912 territory. **Lauth-Juergens Trucks Are Delivery Insurance.**

Address: LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

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New York—West Side Garage & Motor Co., 160-162 W. 101st St.
Duluth, Minn.—Mutual Auto Co.
Chicago—Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
Newark, N. J.—Merchants Motor Car Co., Essex Building.
Toledo, Ohio—Greasser Motor Co., 100-104 Ottawa St.
Bleil Auto Truck Sales Agency, 453 Dix Ave., Detroit, Agent for Southeastern Michigan.
District of Columbia and Vicinity—Bowles Motor Sales Co., Inc., 1608 14th St., N. W., Washington, D. C.

SPECIFICATIONS OF ONE-TON TRUCK

Motor—Rutenber, four cylinder, water cooled, 4″ bore, 4″ stroke. Carburetor—Schebler, float feed type. Ignition—Bosch high tension magneto, dual system. Transmission—Selective type, four speeds forward and reverse. Clutch—LJ Patent disc, 3 piece, simple and positive. Brakes—Two internal on rear axle, two external on jack shaft. Drive—Double chain. Axles—Ball bearing; front, 1¾″; rear, 2″. Wheels—36″ front and rear, Artillery type. Tires—36 x 3″ front, 36 x 3½″ rear. Frame—Solid angle steel 2 x 3″, supported by long truss rods to prevent vibration. Wheel Base—105″. Tread—56″. Equipment—3 lamps, horn, oil can, full set of tools and jack. Weight—Chassis with driver's seat, 2600 lbs. Price—Chassis with driver's seat, $1950.00 F. O. B. Fremont, Ohio.

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Bosch Plugs

Cut Actual Size



A DEPENDABLE highclass product that will give satisfaction in any motor.

Not the cheapest in price, but the best money can buy, the best that experience knows, the best by actual test.

Say "Bosch" to your dealer, insist that it is purely a question of service; you'll be satisfied.

$1.00 Each

BOSCH MAGNETO COMPANY
223-225 West 46th Street NEW YORK

DREADNOUGHT

Moline

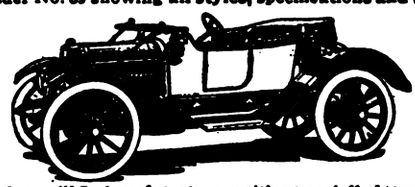
"King of the Road"

The Aristocrat of American Roadsters

This handsome, roomy, foredoor, straight line car with big artillery wheels and tires, has every desired refinement. In addition it is equipped with the famous

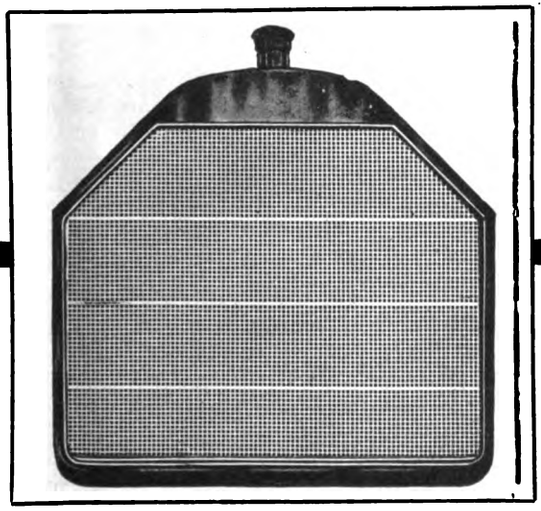
4x6 Long Stroke Motor

unequalled in efficiency, silence of operation and durability. While rated at 35 H. P. this motor will actually develop almost 40. The Roadster shown here is only one of the four New Models of the "Dreadnought" Moline "35." Write for Folder No. 39 showing all styles, specifications and prices.



Dealers will find our latest proposition specially interesting

Moline Automobile Company (11)
61 Keokuk St. EAST MOLINE, ILL.



THE BUSH RADIATOR

IN EFFICIENCY—The Highest
IN APPEARANCE—The Finest
IN CONSTRUCTION—The Simplest
IN SERVICE—The Most Satisfactory

"The Most Practical Radiator"

Ask those who have used them.

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Cone Clutches, Too in Addition to Universal Joints

By specialization we have mastered the engineering problems of cone clutches to a point where we have for some time been able to supply clutches that meet the most exacting requirements of any given working conditions. State the conditions and we will show you what we can do, just as in the case of universal joints. Blue prints will help. Designers and manufacturers are getting to appreciate us more and more, because our products are right when they come, are right when the bill comes, and come right on time.

The Hartford Auto Parts Co.

85 Huyshope Avenue Hartford, Conn.

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You Need Speedo

IT'S GUARANTEED

Price
$3.50
With Decarbonizer
High Power Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

INTERNATIONAL ACCESSORIES CORPORATION

Chicago Branch, FULTON-GRUBB CO., 1150 Michigan Blvd.



WHITNEY

The Most Practical Chain for Motor Trucks

Because the "Whitney" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened or repaired without the use of any special tool. This is of great advantage to truck builders, owners and drivers.

To have your truck equipped with "Whitney" Chains means greater mileage because they are made by specialists in a factory especially equipped for the making and are backed by years of experience. "Whitney" Chains are made from material chosen for quality regardless of cost, and all care taken in their manufacture makes them stand foremost. When making replacements try a "Whitney" and get acquainted with its merits.

"Whitney" Chains Are Built for Strains

The Whitney Manufacturing Co.

HARTFORD, CONN.



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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

Diamond Tires

We could build them cheaper But We Won't

We would build them better But We Can't

ONE big advantage in favor of the dealer who sells Diamond Tires is this:

¶ Diamond Tires include any and every type and style of tire that car owners want, and every Diamond Tire sold builds prestige for all the others.

¶ Diamond Tires are made in all types to fit all styles or makes of rims. The Diamond types are Clincher, Quick Detachable, Mechanical (or Straight-side) and Fisk.

¶ In treads the Diamond dealer can offer the famous Diamond Safety Tread, the regular Smooth Tread, Bailey Tread and Grip Tread.

¶ Every type, every size, and four treads all included in one famous make of tires, and every tire no matter what the type or tread gives the greatest mileage and the best service that can be bulit into a tire.

¶ This is the Diamond dealer's advantage—can you beat it?

If you are not receiving our little magazine for dealers you're missing something good. Send your name—it's free to dealers.

The Diamond Rubber Company
Akron, Ohio

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B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager, 1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

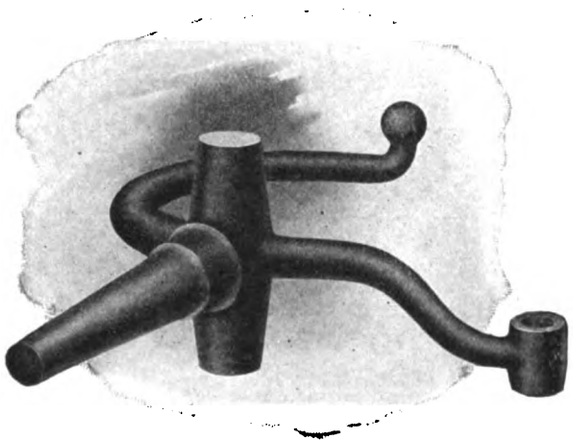
Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

H. SCHROEDER,

Philadelphia, Pa., 1418 Blavis St. President and General Manager Lake Schroeder Auto Exchange.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

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PIONEERS

in making and treating

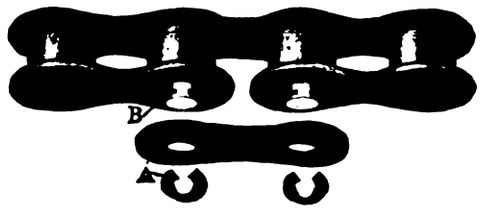
Drop Hammer Forgings

We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio



Baldwin Drive Chains

BOTH DETACHABLE AND RIVETED

are used by the largest, most exacting users of chains for automobiles in the world. They need no further recommendation.



SPROCKETS We are equipped to make sprockets in large quantities at interesting prices.

Baldwin Chain & Mfg. Co.

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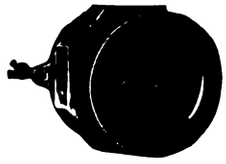
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Registers mileage. Attached to hub. Sealed so that it cannot be tampered with or disconnected without owner's knowledge. Mileage quickly ascertained—always visible.

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COMMERCIAL CARS
PLEASURE CARS

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Made from Drop Forgings and Case Hardened Throughout.

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By Actual Test

(Patented)

The Sparks-Withington One-Piece-Blade RADIATOR FAN will deliver a greater volume of air with less horse-power consumption than any other fan on the market. Bonafide tests furnished to those interested.

With this assurance, and considering that we are specialists in fan construction where you are not, we desire the opportunity only to prove our claims, and, therefore, request your blue prints or a sample fan for estimate. Out of ten standards no doubt we can give you something without making special tools. That would mean a saving to you.

We will gladly test free of charge and submit report on fans you now employ.

Don't fail to write us when you are ready to consider 1912 contract.

THE SPARKS-WITHINGTON CO., Jackson, Mich.

Battery Boxes — Hubs Complete
Ball Bearings — Flanges
Brake Drums — Heavy Stampings

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The Best Oil for All Motors

When a car starts out lively in the morning and then shows signs of sluggishness later in the day, it usually means something is wrong with the lubrication.

Use **POLARINE** Oil and you will avoid two-thirds of all motor troubles.

POLARINE is the best automobile oil yet produced.

It gives the maximum lubrication for the amount used. It insures the least possible friction and wear, with full compression and power.

It leaves no carbon deposit.

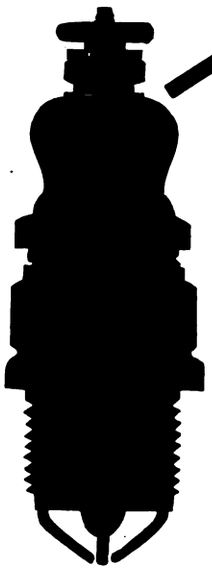
It feeds freely right down to zero.

Look for the flat, convenient can —just fits in the tool-box. Ask your dealer.



Our free booklet tells all about the Polarine Brands, and contains many useful hints on the care of a car. Write for your copy today to any agency.

Standard Oil Company
(Incorporated)



YOU DO

want a smooth-running motor, don't you?

Equip your motor with a set of "AC STAR" spark plugs and you will be able to run at top speed and throttle down with no danger of back-firing, as the superior design of "AC STAR" plugs prevents pre-ignition.

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Inductor

This is the laminated fan-tail inductor. Thin sections of special lamination steel (insulated to prevent eddy currents and electrical loss) are pressed into one solid indestructible unit. It is keyed to the steel inductor shaft with Woodruff key. One inductor revolves on each side of the stationary winding, generating electrical impulses in the winding.

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The Dealer's Cue for 1912



Our Advance Catalog Tells Everything

MARION "35" Five Passenger Touring Car..... $1285
Marion "33" Roadster..... 1150
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R-C-H "Twenty-Five"

Five Passenger Touring Car

Model SS $950 Self-starter and other special equipment.

Standard Model $850 Fully equipped, but without self-starter and other special equipment.

HUPP-YEATS ELECTRIC COACH

"The first advance in coach-making in over a century."

Six models—$1750 to 5000

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THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

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The 5 to 7 Year Service Car

Luxury, style, easy-riding, perfect performance—not for one year but for 5 to 7 years. Built to do it, not simply advertised to do it.

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Find out about this car that stands the critical buying of the shrewdest purchaser in the field—the substantial man who wants service—hard service—long service. All Glide cars provided with Glide Self-Starter without extra cost.

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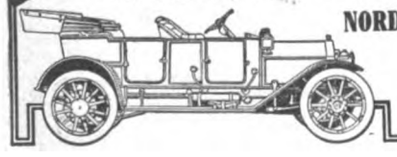
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INTERNATIONAL CHAMPION

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



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Indianapolis, Indiana
Sixty Years of Successful Manufacturing

Abbott-Detroit 1912 MODELS

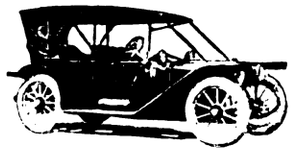
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Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats..... $1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield 1775
Fore-door Limousine, fully equipped..... 3000

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Long-Stroke "32"
Five-Passenger Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires, 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body, on same chassis and with same equipment, $900 F. O. B. Detroit.

20 H. P. Models

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

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Coupe—$1100
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HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

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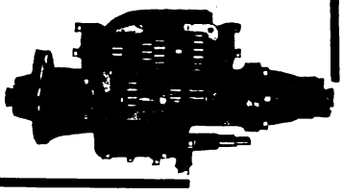
have been approved by leading engineers as the very best for hard exacting service.

If you want to make your car immune to transmission troubles, you should send for complete information regarding the Covert line.

COVERT MOTOR VEHICLE COMPANY

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WINTON SIX

Consider Changing Conditions

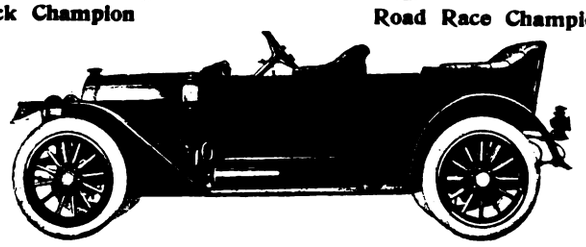
There is more reason for **buying cautiously** right now than ever before in automobile history. "Consider Changing Conditions" gives the inside facts.

Shall we send you a copy?

THE WINTON MOTOR CAR. CO., 426 Berea Road, Cleveland, O.

National 40

Stock Champion Road Race Champion



Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY

1007 E. 22nd Street Indianapolis, Ind.

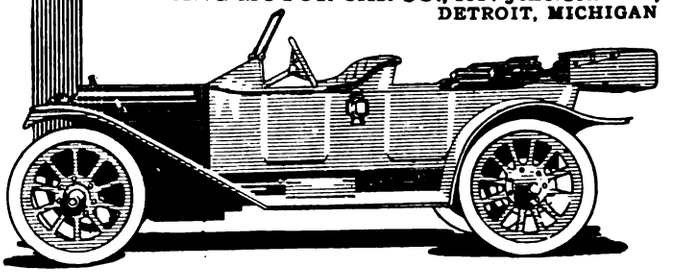
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You have never before been able to offer your customers a car with features like the King—the car with a thousand less parts.

With Full Equipment, Including Self-Starter, $1565

Terms, territory and detailed description on request

KING MOTOR CAR CO., 1314 Jefferson Ave., DETROIT, MICHIGAN

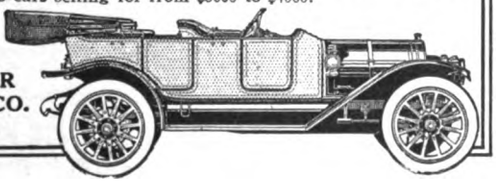


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Jackson, Michigan

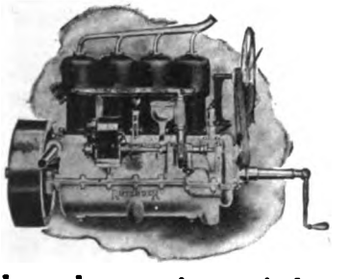
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"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY

222 N. George Street YORK, PA.



There is a certain market for your cars if you put

THE RUTENBER MOTOR

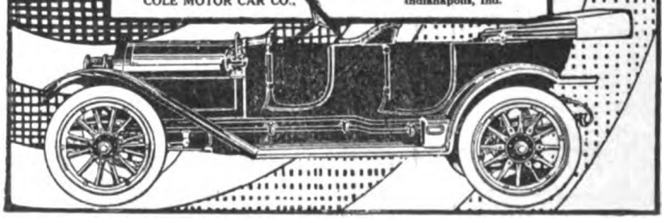
into the chassis. That has been the experience of about thirty automobile makers. Get into touch with us. Write for catalog.

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Ward Leonard Dynamo Electric Lighting System, Self Starter, Cast power plant; 4½" x 5½" motor, enclosed valves; Bosch ignition; Timken axle equipment; 35 x 4 in. wheels; demountable rims; 122-in. wheelbase; nickel trimmings; Seven bodies: $3885.

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Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster, price $1,750; five-passenger Century Brougham, price $1,950. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

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AUTOMOBILE **HORNS** MOTORCYCLE

REED, BULBS AND FLEXIBLE TUBING

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Starter

Adopted by the

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Description and Prices on Request

INVINCIBLE STARTER CO.
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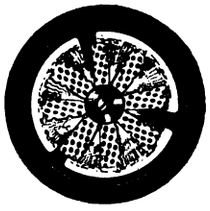
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For All Purposes



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Price $3.00

Saves 10 to 25 Per Cent gasolene. Fits intake pipe. Spins around at great speed and "mixes the mixture." We send it to you on trial. If not satisfactory your money is cheerfully refunded.

THE ROYAL EQUIPMENT COMPANY 436 Housatonic Ave. BRIDGEPORT, CONN.
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You Need This Catalog

We want you to write for the Solar Catalog before you decide on your motor lamps, for this is the most complete line of lamps on the market. Solar Lamps have been preferred by most motorists for the past fourteen years because of their brilliancy, their style, their strength and their several exclusive advantages—their special short focus lead glass lens mirror reflectors—the patented double ray light projection (in the Solarclipse), giving two distinct fields of light, for city and country use—the new black finish, the only such finish that's proof against heat and moisture—and other features that other lamps lack.

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Special Designs for Every Type of Motor Made

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$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

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Specializing Light Commercial Vehicle Parts

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MODEL 95—UNIT TRANSMISSION
Brake and Clutch with Raybestos-faced Discs.
25-35 H. P.

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Steering Gears
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Clutches and
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Cored Bars for Bushings



All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.

Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.

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START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

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MARK YOUR TOOLS



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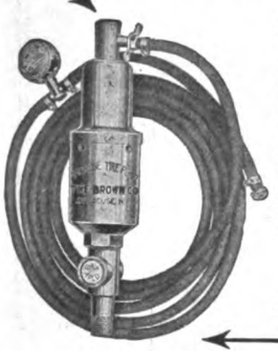
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EMPIRE TIRE CO., Trenton, N.J.

Let Your Motor Do the Work



It's unnecessary to break your back trying to inflate your tires with an old-fashioned hand pump.

The BROWN IMPULSE TIRE PUMP is instantly attached in place of the most convenient spark plug. It fills your tire with pure, cool air, gives a pressure of 150 lbs. in from one to four minutes.

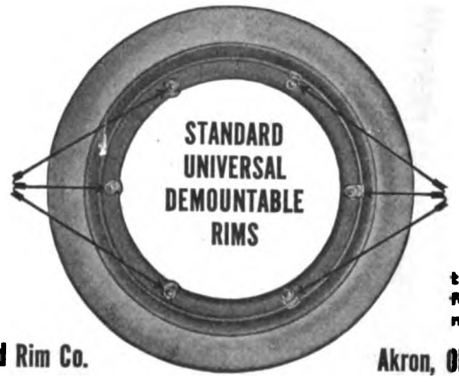
Simple in operation—nothing to get out of order. Made of best materials in a factory especially equipped for its manufacture.

Price $15.00 including twelve feet of hose, HIGH GRADE RECORDING GAUGE AND SELF OPENING VALVE CONNECTION.

A necessary part of your 1912 equipment. Write today for detailed information.

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1025 S. Clinton St. Syracuse, N. Y.

Two Turns LOCKS the Rim in Place



Two Turns UNLOCKS the Rim for Demounting

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Costs Only $20

"The Crankless" STARTER

The Crankless Self-Starter will start your engine every time.

Just Press the Button With Your Foot

The simplest and most practical self-starter on the market.

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Ignition Absolutely Sure

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$2500 to $2900

More than this car offers cannot be bought.

It concedes nothing to its costliest contemporary in structural soundness and strength; in luxury; in ease and comfort; in dignified appearance; or in satisfactory performance — but brings you notable features of design and build that are peculiar to itself.

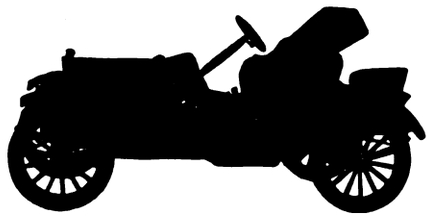


Model 12 H — $2500

Standard chassis of all Speedwell models has 123 inch wheel base and 50 H. P. motor.

SPEEDWELL MOTOR CAR CO.
50 Essex Ave., Dayton, Ohio

Metz "Twenty-Two" Water Cooled



$495

1912 Model Completely Equipped as Shown

Four cylinder motor, twenty-two H. P., valves and all moving parts enclosed and dust proof. Chains enclosed in cases running in oil. High tension magneto ignition. 10,000 miles on set of tires. Ask for Book B, with hill climbing guarantee. Good dealers wanted in unoccupied territory.

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Electrically Self Started and Lighted

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Model 41—4 Passenger Demi Tonneau.
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It is a Certainty

Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.

ANNOUNCEMENT

Pleasure Cars	- 7 Models	$850 to $3500
Delivery Cars, Trucks	- 4 Models	

Now Closing 1912 Contracts

PETREL MOTOR CAR COMPANY
2530 First Avenue Milwaukee, Wis.

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FIAT

"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500
(Completely Equipped)

The Fiat Agency Policy Is One of Permanency

POUGHKEEPSIE **F.I.A.T.** NEW YORK

The Electric Car of Quality

THE COLONIAL

Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

COLONIAL ELECTRIC CAR COMPANY
Detroit, Michigan

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS - SIX - HAVERS MOTOR C A R CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

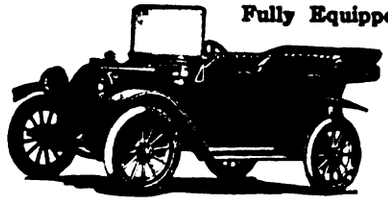
Full specifications sent on request.

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



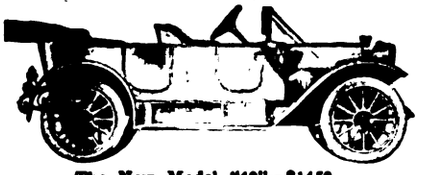
25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

BRIGGS-DETROITER CO., 449 Holbrook Ave. Detroit, Mich.

Oakland

"The Car With a Conscience"



The New Model "40"—$1450
(Top and Windshield extra)

OUR 1912 LINE is built on four chassis, 30 H. P. to 45 H. P. Large variety of body designs. Prices from $1000 to $3000. Established dealers are invited to make application for open territory. Write for advance catalogue.

OAKLAND MOTOR CAR CO., 2650 Oakland Ave., Pontiac, Mich.

It's Great

to be a

McINTYRE AGENT

Established, able dealers are invited to write for information as to open territory. Both pleasure and commercial cars.

W. H. McINTYRE CO., Auburn, Indiana

Velie

Service Satisfaction

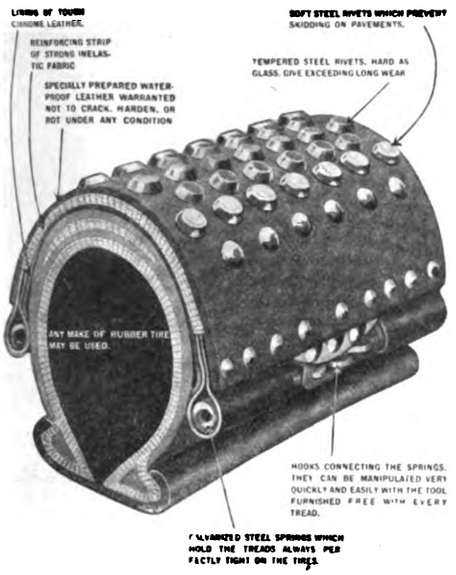
We invite comparisons with any and all manufacturers of automobiles irrespective of price and particularly as respects body lines, finish, and trimming, which he have specialized in for 1912, and so successfully that we feel assured of receiving merited compliments from buyers of the nicest discernment.

Velie MOTOR VEHICLE CO., Moline, Ill.

SHAWMUT TIRES

SOLD EVERYWHERE **SHAWMUT TIRE CO., Boston, Mass.**

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Woodworth Treads

are distinguished from apparently similar devices in THREE important particulars.

1. They are at least 50 per cent. more durable. The life of the best tire protector is the life of its middle rows of rivets. Those of WOODWORTH TREADS have heads glass-hard clear through, not soft like those of other makes.

2. The chrome leather base of WOODWORTH TREADS is impregnated, not with oil, but with a special filler which never dries out and which keeps the leather always soft.

3. The best-made protector is worse than useless if it stretches loose and chafes the tire. WOODWORTH TREADS are drawn always snug by strong side springs. They cling to the tire as if a part of it; no stretching can loosen them.

So closely do Woodworths hug the tires that even dirt cannot enter to do harm. The tendency is always to squeeze it out: if any crumbs remain, they are quickly rubbed to a smooth flour-like paste. Thousands of miles barely mark the rubber.



Woodworth Treads avert skidding and its dangers. They prevent wear, cuts and punctures, and eliminate fabric rotting by keeping the rubber whole. They cost about half as much as tires and last as long, New tires protected by them last about three times as long as when run bare. They save from ¼ to ½ of the tire mileage cost and all tire annoyance.

SPECIAL to DEALERS

We will send any rated dealer or garageman a pair of Woodworth Treads on 30 days' trial. If not perfectly satisfactory they may be returned at the end of that time and the charge will be cancelled.

Write for reduced 1912 prices and our booklet, "The Preservation of Auto Tires."

LEATHER TIRE GOODS COMPANY

NIAGARA FALLS, N. Y.

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SOMETHING EQUAL TO THE BEST WHATEVER THE PRICE

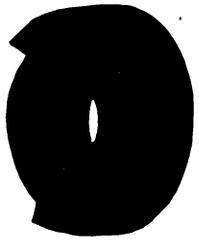
Stands for KLINE KAR Satisfied Owners

4-30	$1700 $1850	4-40	$2200 $2350	6-50	$2800 $2950	6-60	$3300 $3600

The above models completely equipped according to price with Top, Glass Front, Tire Irons, Detachable Demountable Rims, Self Starter, Combination Electric-Oil Side and Tail Lamps, Storage Battery, 4 Speed Transmission.

We have a proposition that will interest any live agent. Complete specifications and catalog upon request.

Richmond, Va. KLINE MOTOR CAR CORPORATION York, Pa.



The superiority of

Schafer Ball Bearings

is conclusively proven by the fact that they are used in the leading cars throughout the world.

BARTHEL, DALY & MILLER
42 Broadway NEW YORK CITY

SBF Bretz Company
Sole Importers
Ball Bearings
250 West Fifty-fourth, New York

Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

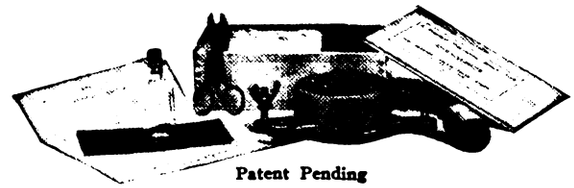
For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.
R. B. ABBOTT SALES CO., Sales Agents, Detroit

WARNING

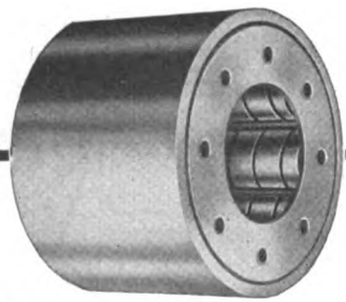
PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio



LONG SERIES

IN high efficiency—first cost—dependability—and in practical value—the Hyatt Roller Bearing is superior.

Hyatt Roller Bearing Co., Detroit, Michigan

—let us build your

MOTOR TRUCK BODIES

—any size, 500 lbs. to 10 tons; any style. Write your requirements and we will submit suggestion—or, send us blue prints for prices.

We build motor truck bodies exclusively and guarantee Quality and Service.

Single bodies or quantities.

MOTOR TRUCK BODY COMPANY
320 Franklin Street Detroit, Mich.

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Letter No. 5

Manufacturers and Dealers Motor Fire Insurance Company
(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

1440 North American Building
Philadelphia

April 11th, 1912.

Messrs. MANUFACTURER, DEALER and COMPANY,
Every City, Everywhere.

Gentlemen--

MR. MANUFACTURER, IS EVERY DEALER ON YOUR LIST SATISFIED WITH THE INCOME FROM HIS BUSINESS?

MR. DEALER, IS THE INCOME FROM YOUR BUSINESS SUFFICIENT TO KEEP YOUR INTEREST AT THE "BOILING POINT?"

You know increased income means increased interest. IF YOU WISH TO INCREASE YOUR INCOME, and at the same time increase the quality of the service you render your customers,

WE WILL TELL YOU HOW TO DO IT.

Yours very truly,
ORGANIZATION COMMITTEE
By Ernest H. Greenwood
Secretary.

P. S. Look for letter #6 on this page next week.

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FISK

Heavy Car Type Tires

For Any Rim

Consumers' Prices Reduced
Quality Unchanged

Size	Casings: Clincher, Q. D. or Dunlop Price	Casings: Bolted-on Price	Tubes: Clincher, Q. D. or Bolted-on Price	Tubes: Dunlop Price
3½ x 30	$20.35	$24.85	$ 4.90	$5.15
4½ x 36	45.20	50.20	9.20	9.65
4½ x 37	46.50	——	9.50	9.95
5 x 36	55.50	58.60	10.20	——
5 x 37	57.00	60.20	10.60	——
5½ x 38	68.30	72.15	12.30	——

PERFORMANCE is the factor behind the success of Fisk Heavy Car Type Tires. Their rapidly increasing sale is due to the verdict of car owners who, once using them, buy again for their own cars and recommend them to their friends. "You are urged to inquire among many Fisk Tire users" because we can present no stronger argument than the everyday service Fisk Equipment is giving. MILEAGE and DIRECT REPRESENTATION combine to make the only service that really interests any buyer. It is THAT SERVICE upon which the success of Fisk Tires is founded.

The Fisk Tube is the Pure Para Tube

This accounts for the slightly higher prices, in comparison with other tubes, at which it is sold. The initial increased expense is slight—the resulting additonal service makes it a far better buy than any one of the many compounded tubes sold at a lower figure. We had but one choice—to lower our present standard and compound our tubes or to hold to present construction and maintain slightly higher prices than other makers. We have decided in favor of quality, believing it far more economical in the end for every buyer.

Two New Anti-Skid Tires

THE NEW FISK TOWN TREAD—Heavy Car Type—This tire provdes a heavy anti-skid tread designed to insure traction and affords the greatest possible protection against skidding. It is positive in action on city pavements and country roads and eliminates the necessity of chains with the attendant expense, noise and inconvenience.

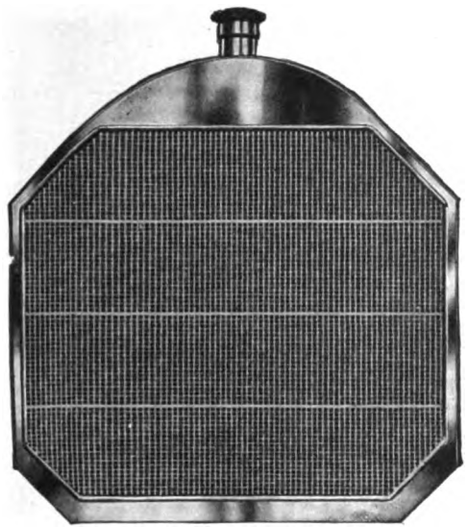
THE NEW FISK BAILEY TREAD—Heavy Car Type—Heavy buttons and one more row than any other Bailey Tread on the market. This increases the anti-skid surface and length of service, as outside rows of buttons give anti-skid protection when center tread is worn down.

Fisk Heavy Car Type Tires Are Sold by All Prominent Dealers

THE FISK RUBBER COMPANY

Department 23 *Direct Factory Branches in 35 Cities* **Chicopee Falls, Mass.**

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The Mayo—the radiator thoroughbred

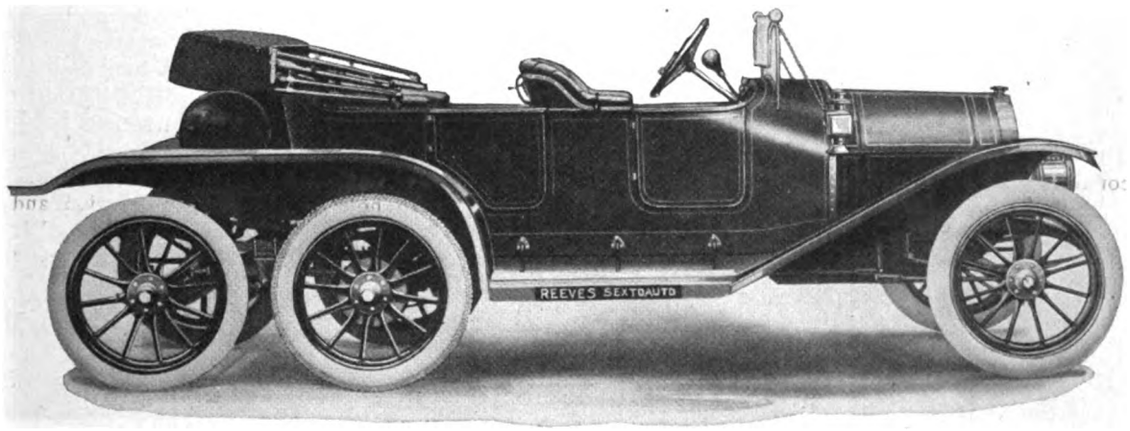
¶ Mayo Radiators are standard on a large number of best known cars in the American market—not because manufacturers consider them cheap but because they have found by test that the actual performance with this radiator justify them in using it to make a good car still better.

¶ We invite the inspection of the most critical, knowing that Mayo quality of material and workmanship and Mayo features of construction will meet with absolute approval.

Mayo Radiator Company

NEW HAVEN, CONNECTICUT

The Reeves "Sextoauto"



The Octoauto's Sister

NO SHOCK
NO JOLT

Rides Like a Pullman Palace Car

NO BOUNCE
NO REBOUND

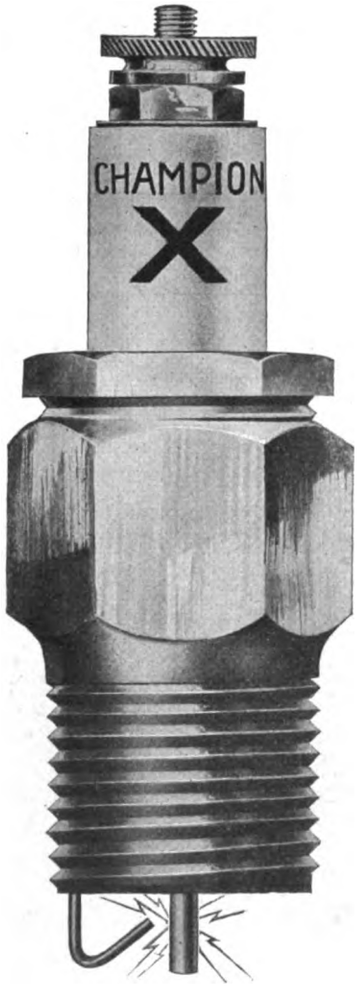
An old and accepted principle to accomplish easy riding applied to the automobile. Not a single experiment embodied in the whole car. It's a phenomenal car, and bound to revolutionize automobile construction where comfort in riding is a consideration. Tire trouble and expense actually reduced. For full information, description and price, address,

REEVES SEXTO-OCTO COMPANY, Columbus, Indiana

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TRADE-MARK

Champion Spark Plugs



CHAMPION X
75 Cents

Special inducements of all kinds and descriptions are offered by spark plug manufacturers in their efforts to increase their sales. Some guarantee their plugs to last forever (or furnish new ones); others boast of the fact that all parts are made by them and that they therefore must be perfect.

We base our claims of the "Champion" superiority upon the fact that over sixty per cent. of the manufacturers in America during 1912 specify Champion Spark Plugs. Ford, Overland, and over fifty other representative makers use the Champion plugs exclusively in their regular equipment.

When a majority of the leading automobile engineers of the country specify Champion plugs in preference to all others, there is but one logical conclusion to be drawn—Champion Spark Plugs **must** have the **goods** in them.

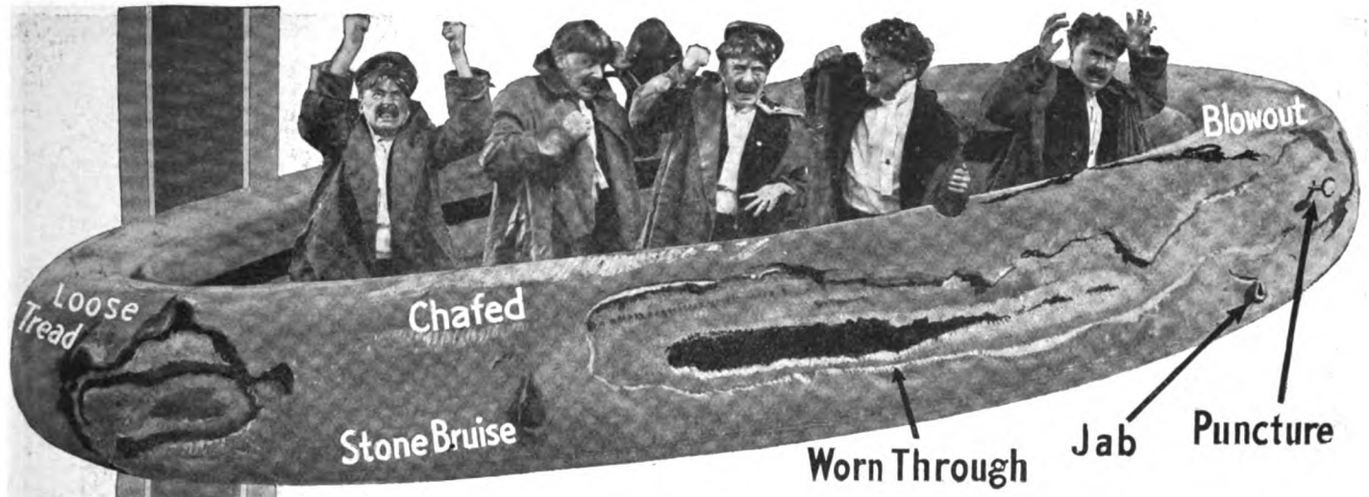
Leading dealers and jobbers carry Champion plugs. Insist upon the **genuine.** The world trade mark (shown above) appears on each box, and the name "Champion" is plainly marked on the porcelain.

Write for our interesting equipment proposition.

The Champion Spark Plug Company

Dept. C, Toledo, Ohio

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Save Those Tires—Old and New

NEVER another day—hour—or moment of tire trouble! "Head off" all tire troubles—stop them—before they come—just as you would insure your house before it burns.

It is good business—it is sound finance—it is common sense to apply Standard Tire Protectors to any tire, even before you give it a mile of road use. Standard Tire Protectors are not an accessory of the needless or novelty type—they are pure, common sense, business insurance, which carries with it freedom from tire-worries, delays and aggravations.

STANDARD TIRE PROTECTORS

will double the life of your tires and more! They are made of the toughest rubber known today. By applying these Protectors to your new tires, you save your tires from the wear and tear of road-contact. The Protectors will wear longer than the bare tires would wear—but when the Protectors eventually do wear out—then you have only to buy new Protectors instead of buying new tires at a greater expense.

Convert your plain-tread tires into non-skid tires without extra cost! These Protectors are made in non-skid tread as well as plain—a non-skid tread so made that it grips any road surface with claw-like tenacity, and **wears**, too. At one operation, without extra expense, you secure this unexcelled skidding protection, in addition to tire protection, when you apply Standard Tire Protectors to your tires.

Get Standard Tire Protectors instead of retreading your old tires. They will protect those old tires against punctures, blowouts, stone bruises, cuts, jabs and all such tire troubles. And besides, without extra cost beyond the price of the Protectors, you change an old, plain-tread tire into an almost new non-skid tire. As a business proposition from every standpoint—get Standard Tire Protectors **now.**

Reduced prices—average 20 per cent. lower than last year on all popular sizes—a further economy gained for you by our new manufacturing advantages, now remove the last reason for you to delay giving your tires this protection. Standard Tire Protectors may be had in all the regular sizes—to fit any tires. They are easily applied in just a few minutes—are held on tight and fast simply by inflation pressure—no mechanical attachments. Do not chafe the tire. Sand or gravel cannot get between the Protector and the tire. Get Standard Tire Protectors **NOW**—whether your tires are old or new—and **end** your tire troubles.

A Free Book on Tire Protection

will be sent you on request. It proves the five-dollar-for-one, and often higher, value to you of Standard Tire Protectors.

Dealers: More business and bigger discounts on Standard Tire Protectors. The old "bugaboo" of "Price too High," killed. Write us at once for particulars of our 1912 Sales Co-operation to Dealers, and new Price List.

THE STANDARD TIRE PROTECTOR CO.
430 E. Market Street, AKRON, OHIO

Ask the Man Who Uses Them



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Not Equipped for the Part

A camel once saw a cat on his master's lap and was jealous of the petting the cat received. Wishing to take the same place in his master's affections, he tried to occupy the same place in his lap. His intentions were excellent but he wasn't equipped for the part.

It's *"equipment"* that counts in speedometer business.

The *Stewart Speedometer* has for years occupied the most prominent place in the *affections* of the automobile public. There are *other* manufacturers who wish to take the same position. Their *motives* are splendid but they aren't equipped for the part.

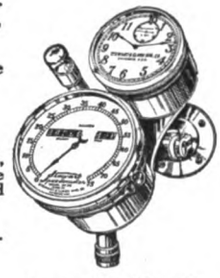
The Stewart Speedometer is built in the *largest* speedometer factory in the world. The factory's so *big* that the price is *small*, but the Stewart is the best *constructed*, longest *enduring*, and the most exquisitely *accurate* speed indicator on earth.

Wear proof, *weather* proof, *condition* proof. *Four* cars out of *five* carry the *Stewart*.

What better test to prove it best?

Magnetic principle; jewel bearings; wearing parts hardened and polished; open dial; large figures, easily read; absolutely accurate; 100,000-mile season odometer; 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft; drop forged swivel joint; noiseless gears.

"ALWAYS ON THE JOB"



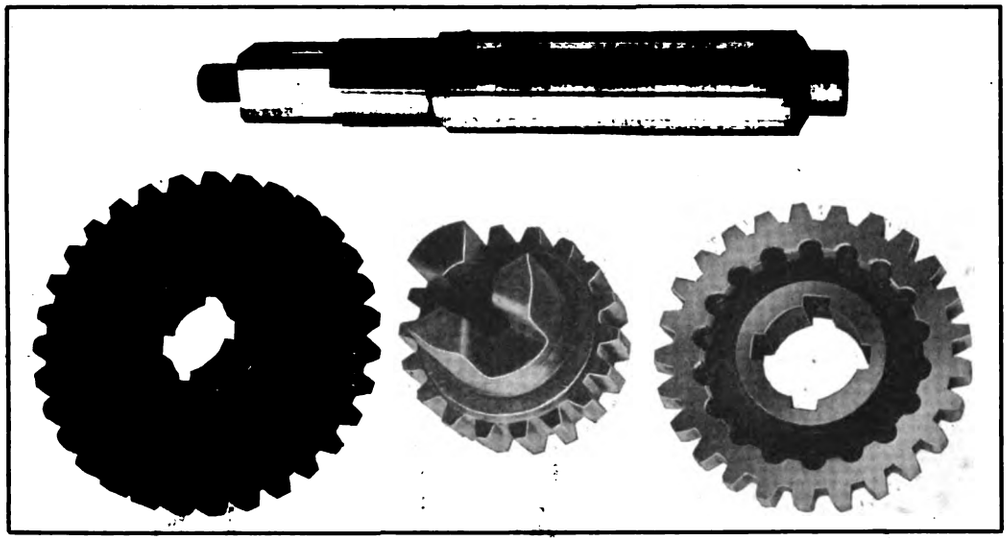
Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

Stewart & Clark Manufacturing Company
1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston Kansas City
Cleveland Philadelphia Minneapolis Indianapolis London Paris

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Transmission Gears



300,000 Grant-Lees Gears for 1912

LARGEST GEAR MAKERS IN THE WEST

TRANSMISSION GEARS — BEVEL GEARS
HELICAL TIMING GEARS — DIFFERENTIALS
WORM GEARS AND WORMS

Remember— Every gear is inspected seven times
Every gear is guaranteed
Every gear is shipped when promised

You— Mr. Motor Car Builder must protect your output by dealing with Responsible Gear Makers. You must have good gears and they must be delivered on time.

THE GRANT-LEES MACHINE COMPANY, Cleveland

Helical Gear Pioneers in the United States

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A Small Edition of a $5000 Car for $850

The Empire 25 presents amazing opportunity to buyers as well as dealers. An $850.00 touring car with all the essentials of $5000.00 Cars except needless power and cumbersome size. The Big Brother of the Famous Empire Roadster.

Empire 25

The Little Aristocrat

This stunning little car—called "The Little Aristocrat" because of its striking design—is distinctly different from all other cars in the **sub-thousand dollar** class.

The Little Aristocrat has all the efficiency of the highest type cars. It is roomy—powerful—speedy—dependable. Five people can ride in ease and comfort and it has power enough to take them anywhere. No hill can stop it. It will travel 40 miles an hour. In short it enjoys every advantage had by the best of small cars and one advantage that none of them has ever approached.

For this car is not only efficient but **beautiful** as well. It has been graced with the same distinctive lines of beauty and character that have lent exclusiveness to cars of the five thousand dollar class. It **is** a $5000.00 car as seen through a reducing glass—a small car of **real quality** built for big car owners as well as for those whose means have been unequal to the high initial cost and the heavy drain made by all **large** cars of The Little Aristocrat type.

How We Got Our Design

The design of The Little Aristocrat is one of its most distinctive features. It is the result of a contest in which we offered a prize to the body designer whose specifications we accepted.

Nor did we stop with the mere **design.** We carried our **big idea** into the **finish** as elsewhere—finished The Little Aristocrat in Empire **Blue** and **Black Enamels,** the royal sign of **Quality.**

The upholstering we made **luxurious** and inviting. The seats we made **extra** wide and deep and the spring cushions **extra** thick and comfortable.

The doors also we made extra large, and with inside handles to facilitate getting in and out. Interior equipment throughout is only such as to please the most fastidious.

The dash and cowl we made of aluminum in one piece, thus following the custom of the **highest priced cars.**

The Steering Wheel we built extra large. It is 17 inches in diameter; most cars have 15 inch Steering Wheels.

The Steering Knuckles as well as the **axles** we made extra heavy for greater strength and safety.

The Clutch is disc type, Raybestos, 9 inches in diameter instead of 5, the kind commonly used on cars of this **size.**

Big Hubs for style—big Artillery Wheels equipped with Big Tires for easier riding, tire saving and maximum ground clearance—a free running board and fenders of the most approved type, serve to put class and character into this car.

In short we gave this car a **distinction** all its own.

No other car is like it.

SPECIFICATIONS OF THE EMPIRE 25

Motor—25 H. P., 3½ inch bore, 4½ inch stroke—cylinders cast in pairs.
Cooling System—Large radiator in conjunction with a belt-driven fan. Circulation effected by the thermo-syphon method.
Valves—Fully enclosed, adjustable for wear.
Lubrication—Constant level, force feed.
Ignition—High tension magneto, set spark.
Clutch—Disc clutch, dry plate type, Raybestos faced.
Control—Single lever center control. Throttle lever above steering wheel. Clutch service and emergency brakes operated by foot pedals.
Steering—Full worm and gear type.
Brakes—Two external, contracting. Two internal, expanding on rear wheels.
Transmission—Three speeds forward and reverse, selective type, mounted on annular bearings. Unit power plant.
Gears—That are silent even when shifting.
Rear Axle—Semi-floating type.
Front Axle—I-beam section, drop forged. The size of the steering knuckles would do credit to a car twice the weight of the Empire.
Springs—Three-quarter elliptic rear, semi-elliptic front.
Wheel Base—104 inches.
Wheels—Selected second growth, artillery type, 32 inch quick detachable rims.
Body — Aluminoid steel, wood trimmed; fore-door, full vestibule, straight lines from front to rear, ample room in tonneau, seats wide and deep, buffed leather cushions comfortably slanted, inside handles on doors.
Frame — Pressed steel, channel section, dropped, giving low center of gravity and easier riding qualities.
Gasoline Tank—Capacity, 12 gallons.
Standard Equipment — Includes magneto, gas lamps, side oil lamps, tail lamp, tools, repair kit, tire pump, jack and horn.

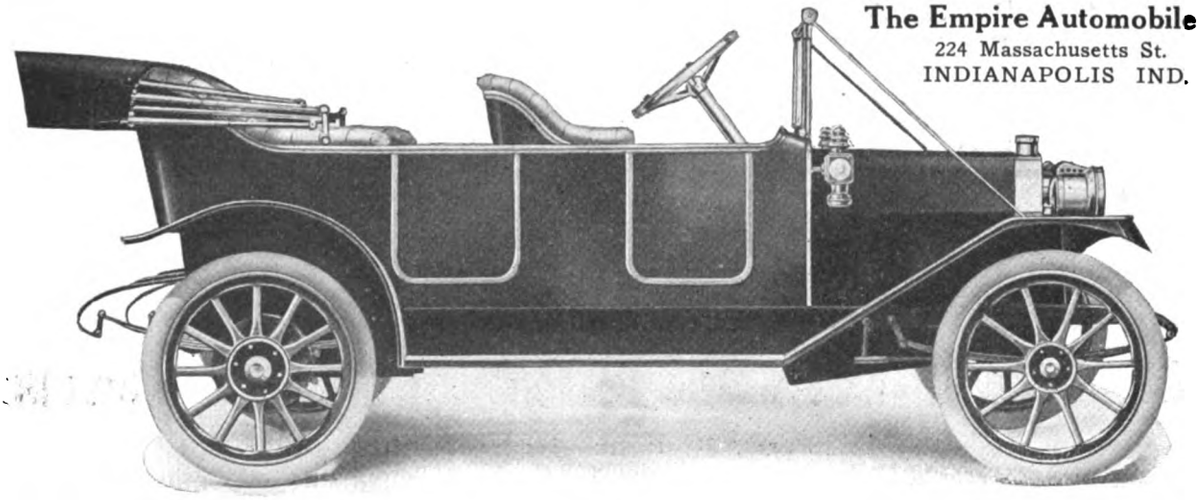
A Market of Half a Million

Dealers everywhere are showing a rapidly increasing interest in this wonderful little car.

Never before has a car been offered that presented such astonishing possibilities. Its low price and unequaled quality are points found in no other car.

Thousands will buy Little Aristocrats this year and tens of thousands next year. Every community will have its owners. And every dealer who handles them will experience a wonderful "picking up" in his automobile business.

The most liberal proposition is waiting for you to ask for it. Write at once.

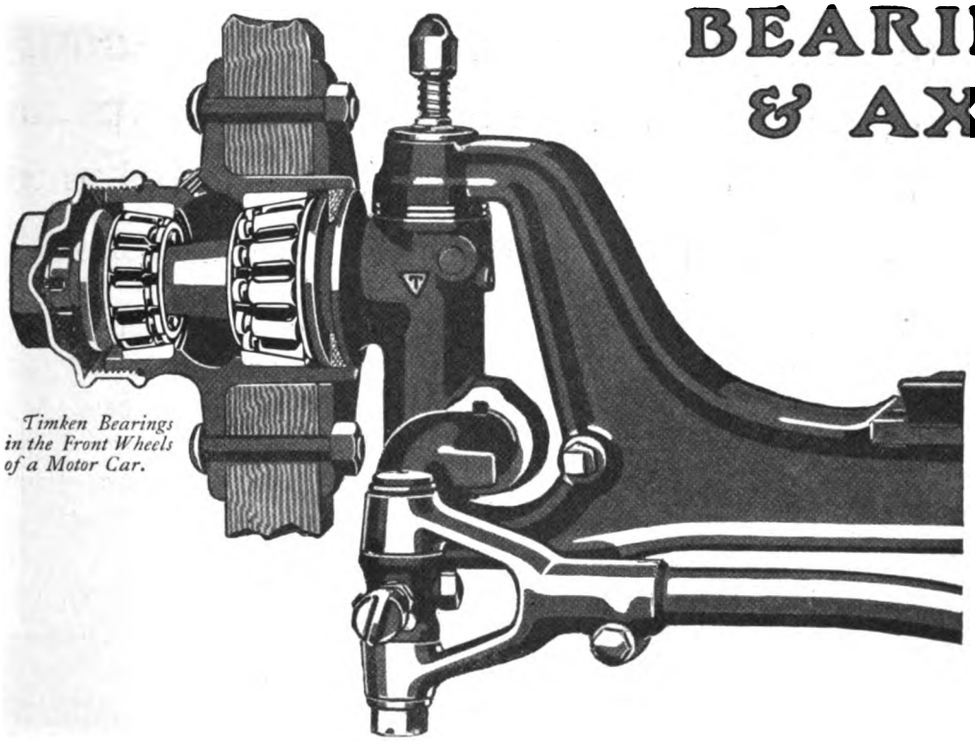


The Empire Automobile Co.
224 Massachusetts St.
INDIANAPOLIS IND.

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TIMKEN

BEARINGS & AXLES



Timken Bearings in the Front Wheels of a Motor Car.

Right here—the point of hardest service—Timken Bearings proved the correctness of their principle and won their way to other uses.

Do you know what your front-wheel bearings have to meet when your car rounds a corner?

The whole weight of the car and its load is suddenly and violently thrown toward the outside of the curve.

The front-wheel bearings get almost the whole of this tremendous pressure—called "end-thrust."

On a rough road the swerving and jolting of the wheels is practically constant.

Every stone, every rut, means a sledge hammer blow on the bearings—first one side, then the other.

Only bearings that can stand this end-thrust—Timken Tapered Roller Bearings—will do for front-wheel service.

Timken Superiority Depends on Correct Principles

Timken Bearings have the greater strength—the greater capacity for hard service—because their tapered rollers carry the load along lines instead of on points as balls do.

They meet end-thrust as easily as weight—because they are set at an angle to the shaft.

No matter whether the force comes from above or from the side, it can never meet the roller end-on, it is always resisted by the long supporting area of contact.

Another great Timken Bearing advantage is resistance to wear.

Of course wear will come sometime—no bearing could be made that wouldn't wear.

But the Timken Bearing *can be adjusted to take up that wear* by advancing the cone into the cup.

Timken-Detroit Axle Construction Completes Your Assurance of Safety and Satisfactory Driving

Because Timken policy overlooks *no* factor in safe and sure axle building.

The little things are there as well as the big.

We believe Timken alone has them all.

And that is why they are today meeting the test of actual service in thousands of cars of every type—pleasure and commercial.

THE TIMKEN ROLLER BEARING COMPANY
Canton, Ohio
THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Mich

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Never in the history of the tire industry have prospects for a coming season's business loomed up as bright as they do today before every United States Tire dealer.

Possibly because never has a tire dealer received such substantial "backing from the manufacturer as the United States Tire dealer is getting today.

The "backing" which he gets in the matter of tire quality alone is enough to win for him the predominating place in the tire trade of any community. Motorists are not long in finding out that the four-factory co-operative methods employed in building United States Tires give to a tire strength and stability that can be put into it in no other way.

But add to this quality advantage the absolute protection in the retail field which the United States Tire dealer now enjoys—the first and only protection ever offered to a tire dealer by any manufacturer.

Add to this an established consumer demand built up thru a decade spent in good tire building by the four separate companies—strengthened by the past remarkably successful year under the new organization—and now focused on the store of every dealer who handles

UNITED STATES TIRES

Then you will realize why the best dealers in this country have been won over to United States Tires in a body. Four out of five are now handling them.

We are facing a season that promises to be one of the most successful in automobile history. Over half a million cars are on the road calling for an aggregate number of tires well over the two million mark. You owe it to yourself and to your business to get all the help possible in capturing the bulk of this trade in your territory.

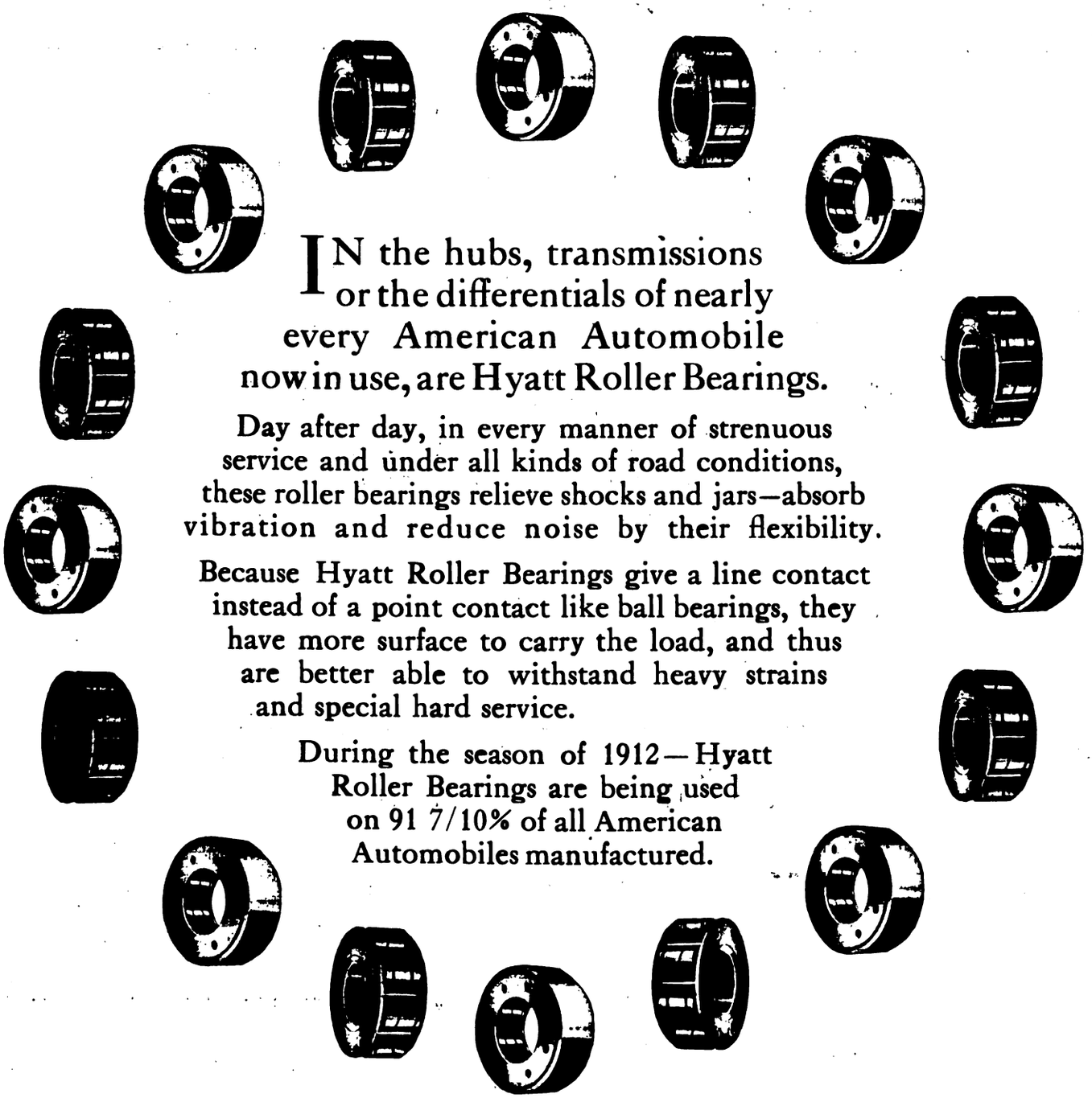
Decide for yourself which among the tire makers is in a position to give you the most.

UNITED STATES TIRE COMPANY

New York

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ROLLING
ROUND and ROUND



IN the hubs, transmissions or the differentials of nearly every American Automobile now in use, are Hyatt Roller Bearings.

Day after day, in every manner of strenuous service and under all kinds of road conditions, these roller bearings relieve shocks and jars—absorb vibration and reduce noise by their flexibility.

Because Hyatt Roller Bearings give a line contact instead of a point contact like ball bearings, they have more surface to carry the load, and thus are better able to withstand heavy strains and special hard service.

During the season of 1912—Hyatt Roller Bearings are being used on 91 7/10% of all American Automobiles manufactured.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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Mr Dealer—You Get a $20 Big Share of This Money

Just press a button with your foot—that's all the "mechanical" knowledge you must have to operate the Cox Crankless self starter. It's simple, fast and certain, and

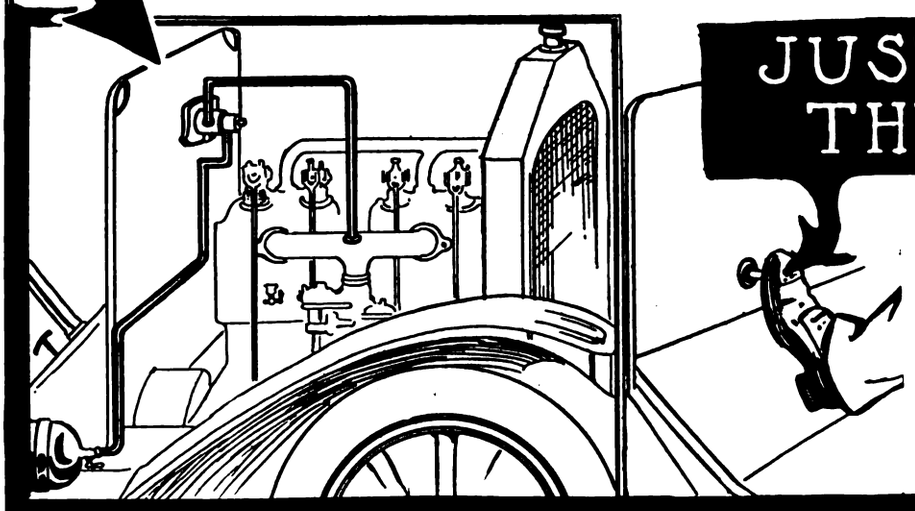
It is guaranteed by a manufacturing concern that has been in business for 40 years. The entire standing and reputation of the Cox Brass Mfg. Company is back of every

"Crankless" STARTER

The Crankless Starter is easy to instal (it ought to take only a few minutes), is light and exceedingly simple and sturdy.

For cars not equipped with vibrating coils we are prepared to furnish a mechanical vibrator at the nominal cost of $5.

We have a fine lot of splendid territory open. Live dealers had better write at once. Our price is right and our discounts are right.



JUST PRESS THE BUTTON

COX BRASS MFG. CO.
Albany, New York

ALBANY, N. Y.....Pearl & Van Woert Sts.
NEW YORK CITY.....1777 Broadway
BOSTON, MASS.....899 Bolyston Street
DETROIT, MICH.....870 Woodward Avenue

ESTABLISHED, 1872

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Withstands All Climatic Conditions

THE bulb horn is inadequate in many ways. It is effected more or less by heat, cold, dirt, water, etc. Its operation is more or less difficult under varying conditions of travel, because of the use of robes in winter, storm curtains in bad weather, etc. Usually, when most needed it is least responsive. Then the signal note has been declared inadequate for a safe warning signal on a modern motor car.

¶ Exhaust horns depend entirely on the speed of the engine, the ability of the driver to have a free foot for operating the lever, and in case of emergency, a hand or another foot free for speeding up the engine so as to get a loud signal note. In case of emergency, such action is absolutely impossible and the exhaust horn fails utterly as an adequate signal.

¶ The TUTO electric horn operates without any decrease in efficiency under all climatic conditions, and regardless of the presence of robes, storm curtains, etc. The TUTO will give its signals, low or loud, just when needed, as the operating button is located on the steering wheel right under the thumb. It is always accessible and does not require the moving of a hand or foot, just the pressure of the thumb.

¶ There are no pivots, bearings, brushes or other parts to require constant attention, and to become clogged with dust or damaged by water. Furthermore, the TUTO horn is always under constant test. The same horn, the same button, the same cord and same battery which is used in making the low note (service signals used in place of bulb horn) are employed in producing the loud emergency signal.

¶ The TUTO is always on the job and is absolutely dependable, regardless of adverse climatic conditions. This makes the TUTO horn essential as standard equipment for all motor cars.

The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen."

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MAY WE HAVE YOUR LAYOUT

Of Bearing Installation?

¶ We can save you money, time and trouble—in other words, show you a short cut to satisfactory bearing installation.

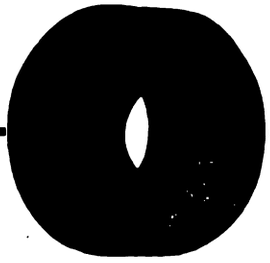
¶ The successful use of New Departures in 60% of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established.

¶ This fact also constitutes a good reason why you should send us your layout and give our engineering and sales departments an opportunity to place our proposition squarely before you.

¶ Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service.

The New Departure Mfg. Company

BRISTOL, CONN.



1016 Ford Bldg. DETROIT, MICH.

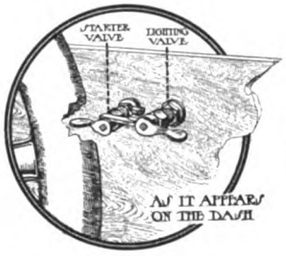
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Self Starter HANNA

BECAUSE the Hanna Self Starter accurately measures and then mixes your gas in the cylinders of your gas engine explains why it is the only 100 per cent. efficient self starter and one that does not foul or soot your plugs.

The first acetylene starter on the market. The only 100 per cent. efficient self starter.

Don't confuse the Hanna with any manifold starter that charges your engine as it stops. The Hanna Self Starter puts gas into the cylinders of your engine when you are ready to start the engine, not the week before, the day before or the night before.



The Gas Lighter alone is worth the $10

But we give you both gas lighter and manifold self starter for the one price of $10. And we fully guarantee our offer, too. Don't make any mistake about that. We guarantee the Valentine manifold starter just the same as we do any other of our products. There isn't a single manifold starter on the market that's any better than the Valentine and few so good.

No manifold starter at any price is better than this at $10.

We sell the Valentine Manifold Starter and electric gas lighter for $10 because that's all it's worth. That's all any manifold starter is worth. The lighting device is thrown in for good measure to make our offer a real bargain.

Dealers—This is the greatest chance you'll ever have. Better get your hat in the ring before it's too late.

J. H. VALENTINE CO., Syracuse, N. Y.

The Valentine MANIFOLD STARTER and Gas Lighter

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Overland

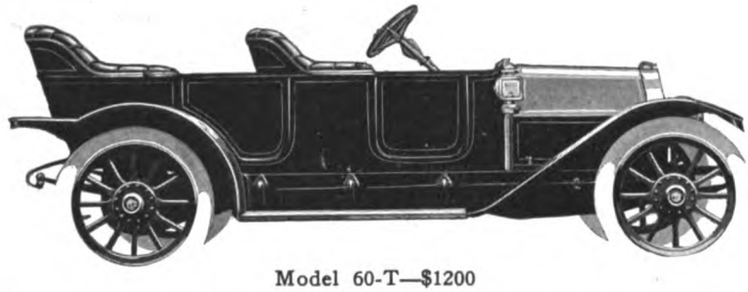
THE greatest difference in popular priced cars today is the difference in price. And this is entirely due to the size of the plants that produce them.

Our thirty-five horsepower touring car is priced at $1200. You seldom find a car of this size and type much below $1500 for the very simple reason that no other factory can produce it for this price. If they could they would. So why should you pay the difference?

Compare values and you will quickly realize the utter folly of paying $1500 for a car that can offer no more than our Model 60 at $1200.

Write for a catalogue. Please ask for book 1-44.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, April 11, 1912. No. 3

TIRE FACTORY ON PACIFIC COAST

Building Already Erected in San Diego, Cal., and Equipment Now in Progress —Spreckles Family Interested.

After several false alarms which have been sounded during a period of ten years or more, a full-grown automobile tire factory is actually to be erected on the Pacific Coast, and under auspices that are not to be denied. As a matter of fact, the Savage Tire Co., which is the title of the project, was organized several months ago, and, without any considerable display of printed fireworks, has been constructing a considerable factory in San Diego, Cal. These buildings have just been completed, and the necessary machinery is being installed as rapidly as it is received from the machinery manufacturers in the East, with whom the orders for the factory equipment were placed.

Despite its location far from what is considered the center of the tire industry of this country, that the San Diego project must be accepted seriously and that the Savage Tire Co. is entitled to more than respectful attention is indicated by the personnel of its official staff. Arthur W. Savage, who was identified with the Savage Arms interests, is president of the company, and John B. Spreckels and Claus Spreckels, the multi-millionaires who made their immense fortunes in the sugar business, are vice-president and secretary, respectively. W. P. Book occupies the post of treasurer.

For some time reports have been afloat that these gentlemen were very much enamored of a non-puncturable tire embodying unusual material or of unusual design, and President Savage informs the Motor World that these reports have served to bring uncounted thousands of inquiries, to which, however, no reply has been made. For the present, the Savage Tire Co. will say nothing definite concerning the nature of the tire which it will produce, nor will it be ready for marketing for several months.

Empires to Be Made in Three States.

According to Hoover Holton, sales manager for the Empire Automobile Co., the new Empire "25" is to be manufactured in three different parts of the country. One factory now is in operation at Greenville, Pa., where 1,000 cars will be built this summer, with deliveries to begin by April 15th. The other two factories are to be operated in Indiana and Missouri. In the former, the site will be in either Indianapolis or Knightstown, while in the latter the cities under consideration are Kansas City and St. Joseph. The general offices of the company will remain in Indinapolis indefinitely, if not permanently.

Goodyear Declares 100 Per Cent. Dividend.

In Akron, O., where uncommonly luscious "melons" ripen in tire factories, another choice fruit has been prepared for cutting, the directors of the Goodyear Tire & Rubber Co., at a meeting held yesterday, 10th inst., having voted to distribute a stock dividend of 100 per cent. The distribution of this "melon" will be made possible by an increase of capital from $6,000,000 to $15,000,000. The proposals will be submitted to the stockholders for ratification at a meeting which has been called for May 28th.

Dyneto to Remove Plant to Syracuse.

Having outgrown its factory in Elbridge, N. Y., the Dyneto Electric Co., manufacturer of the electric lighting system of that name, is preparing to remove to Syracuse, N. Y., where a larger plant will be located. Several sites are under consideration, one of which probably will be definitely selected within the next few days.

Light Truck Coming from "Up-State."

Cram & Sovereign, of Geneva, N. Y., have embarked in the manufacture of motor trucks. They have a 1,500-pound wagon almost ready for the market. It is reputed to incorporate a number of particularly desirable mechanical features.

TIRE PRICES SET TRADE AWHIRL

Goodrich and Fisk Spring Surprises But Goodrich Surprises Even Fisk—Reductions Instead of Increases and End Not Yet in Sight.

After several days of feverish activity, during which the rush to place orders for tires, in anticipation of an increased price, reached astonishing proportions, that overwhelming portion of the trade which has to do with tires awakened with a start on Sunday last. For on that day, in the form of conspicuous advertisements in the daily press of all of the larger cities, the B. F. Goodrich Co. threw a price bomb, the effects of which it is as yet impossible to measure. Instead of an expected increase, the Goodrich company announced a reduction of approximately 16 per cent., not in its trade prices but in its prices to the public.

The Goodrich intentions had been so well guarded that not even the big company's chief competitors anticipated a move of the sort. They were taken wholly by surprise. The resulting conferences which were called in haste are still in progress. It is fairly well settled, however, that the Goodrich figures will be quite generally met, and that all of the great volume of orders which was invited or placed last week, in anticipation of an increase, will be taken care of at the newer and lower quotations.

Last week, as the Motor World exclusively announced, the Fisk Rubber Co. scheduled an increase in the price of its productions which, it was stated by those in position to know, would apply, however, only to trade prices and on tires of 3 inches and less, and on all inner tubes, the catalog figures being left unchanged. The new discounts were to become effective on Wednesday, 10th inst., and foreknowledge of the fact served to cause a great rush to cover, dealers and jobbers buying heavily and other manufacturers inviting orders in

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anticipation of the general increase which seemed so plainly foreshadowed.

On Monday, the Fisk revised list was placed in circulation and disclosed that instead of an advance applying merely to the smaller tires and to trade prices, list prices had been pared from top to bottom.

As the Fisk branches had been officially advised last week of the intended and restricted increase, the reports that caused the heavy buying last week were well founded. What caused the Fisk company so suddenly to change front is not known, but apparently the Goodrich company became possessed of advance knowledge of the Fisk new list, and promptly proceeded to surprise the surpriser, so to speak. At any rate, when on Sunday the Goodrich announcement appeared with the reduction, which brought down the 34 x 4 from $37.75 to $31.30—$2.30 less than the Fisk price—and all others in proportion, the trade was placed at sixes and sevens and it has not yet wholly straightened out itself.

Yesterday, the United States and Diamond companies met the Fisk quotations.

Most of the other tire manufacturers are either "up in the air" or are in conference with their respective staffs, but, as stated, the intimation has been permitted to gain currency that practically all of them will meet the Goodrich list. As a matter of fact, few of them can well afford to do otherwise.

The market has become so unsettled by the unexpected turn of events that there is comparatively little buying by the trade. Such orders as are being placed are being booked conditional on the maintenance of present prices, and on lower ones should the pendulum swing that way, as some of those identified with the industry appear to think will come to pass. Heretofore the larger tire manufacturers have operated in sympathy with each other, their prices, due to "telepathy" or other causes, having been the same. The "waves" appear to have gone wrong on this occasion, however, and there are those who will be disappointed if a rare old fight does not result.

The extent of the new quotations is illustrated by the figures prevailing on the more popular sizes, as follows:

Size	Goodrich	Fisk-U. S.	Old Prices
32 x 3½	$21.20	$21.70	$24.40
34 x 4	31.30	33.60	37.75
36 x 4	33.35	35.80	40.25
36 x 4½	42.05	45.20	50.75
36 x 5	51.65	55.50	62.30

The prices of tubes, too, have dropped in approximately the same proportion to the drop in the price of casings. Goodrich 32x 3½ tubes now list at $4.50, with the price of U. S. and Fisk tubes of the same size 15 cents and 65 cents higher, respectively. The old price was $5.20. The Goodrich price for 34x4 tubes now is $5.95, and the U. S. and Fisk prices are $6.40 and $7.05 respectively; the old price was $7.15. Though the price of U. S. and Fisk casings is the same, tube prices vary by approximately 50 cents, the difference in each case being in favor of the U. S. tubes.

GILBERT-REPUBLIC ON CALENDAR

Fight Over Pickard Rim Due for Trial—Claim and Counter Claim and Spirited Answers to Both.

Although it is nearly ten months since Justice Blanchard, sitting in the New York Supreme Court, signed an attachment in favor of Joseph M. Gilbert, of New York, against the Republic Rubber Co., of Youngstown, O., and its New York branch, it appears that the merits of the dispute never have been aired, and that the transfer of the suit to the Federal courts will give the warring parties the first chance to argue the case before a tribunal. The transfer took place upon repeated request of the Republic Rubber Co., which claimed immunity from state court jurisdiction on account of its being a foreign corporation, which request finally was granted late last fall, and the case is now on the April trial calendar.

As will be recalled, the action hinges upon a patent covering a detachable rim, No. 771,445, issued to Orson L. Pickard, October 4, 1904, and reissued November 13, 1906, as Reissue No. 12,450, which patents, after considerable effort to market them, were purchased by the Republic company for a cash consideration and a royalty of 1¼ per cent. on the total sales. As told in the Motor World of June 15, 1911, Pickard claims he had a hard time trying to make the Republic company live up to its contract, and, lacking the means to engage in an expensive patent litigation, transferred all his rights and claims to Joseph M. Gilbert, general manager of the United States Tire Co., for a valuable consideration. Gilbert thereupon instituted suit for $8,500, which sum represents the accrued royalties for four years plus interest.

In its reply to these charges, the Republic Rubber Co. admits that it made the contract with Pickard, and that it did not pay the royalties agreed upon, but charges that Pickard had agreed not to transfer his patent rights to any other firm or corporation; that he did transfer such rights to Gilbert, an officer of a competitive concern, and that he thereby violated his contract. This, in effect, it is claimed, released the Republic company from further obligations. In addition, the answer charges that this transfer of Pickard's rights resulted in considerable loss and damage to the defendant's business, for which loss it files a counter claim for $10,000.

In terse, clear language, the reply of Joseph M. Gilbert, who now is general manager of the United States Tire Co., to the charges contained in the defendant's counter claim, states that he notified the Republic company of his acquisition of the Pickard rights and asked for the royalties due; being refused, he then proceeded to employ the patented article, as he was entitled to do according to his agreement with the patentee. He emphatically denies using the patented rim previous to his acquisition of the claim and rights of the patentee.

$110,000 Suit Is Settled Out of Court.

"If it ever goes to trial" was the preface of the Motor World on January 25 last, in relating the filing of a $110,000 suit in the New York Supreme Court by Thomas Salisbury Huff and Charles E. Coryell against the Imperial Storage Battery Co., and, as events proved, the case never did come to trial, the warring parties electing to adjust their differences out of court. In their complaint Huff and Coryell charged the Imperial Storage Co. with withholding their broker's commissions and bonus for arranging to sell Imperial stock. The company's president filed a vigorous, none-too-complimentary reply to these charges, and, probably to avoid an airing of these charges and countercharges in public, the suit was amicably settled.

To Call Conference of Sales Managers.

In order that they may compare notes, exchange opinions and otherwise "reason together," the sales managers of the companies comprising the Automobile Board of Trade will be called together for a meeting in New York, which will occur after the rush of spring business is over, probably in June. The decision to do so was reached at the general quarterly meeting of the Board of Trade in New York on Thursday last. The meeting of the sales managers will be directed by the Board of Trade's trade committee, which comprises H. O. Smith, chairman; E. R. Benson, W. E. Metzger, C. W. Churchill and W. T. White.

Larger Factory for the Saxon Lamp.

The Saxon Mfg. Co., which several months since was organized in Toledo, under the laws of Ohio, to manufacture lamps and horns, has leased a five-story brick factory building on Cherry street, Toledo. It will take possession in the early summer. The new structure will afford about five times as much room as the present plant occupied by the Saxon company. Herman Saxon, the president of the concern, formerly was the head of the Saxon Lamp Co., of New York, which went into bankruptcy at about the same time that the Ohio corporation was organized.

May Be Fined for Failure to File Reports.

For failure to file corporation reports for the year ending December 31, 1910, Cimiotti Bros., New York agents for Pullman cars, and the Hotchkiss Import Co., of New York City, have been sued by the United States government for $10,000 each. The sum represents the maximum fine which is provided for in the corporation laws for failure to file the annual report.

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WEED TIRE CHAIN WINS IN WISCONSIN

"'Anchors' a Subterfuge to Evade Patent," Says Court—Non-Creeping Principle Again the Issue at Stake.

Having evolved a non-creeping tire chain, which the Channon counsel held did not infringe the Parsons patent, the H. Channon Co., of Chicago, in no uncertain language, hurled defiance at the Weed Chain Tire Grip Co., and as a result the Weed company accepted the challenge; but instead of acting directly against the Channon company, the Weed interests selected and proceeded against a Wisconsin customer of the Channon company for infringement of the Parsons patent, and last week obtained the preliminary injunction prayed for.

Herbert R. Johnson and Alexander P. Schellin, who constitute the Wisconsin firm and who had purchased parts from the Channon company and employed them in what they styled the Pioneer Chain Grip, were the nominal defendants. The actual defense, however, was undertaken by the Channon company, and as a test case the merits of the patent and of the articles involved were exhaustively gone into before Judge Sanborn, in the United States District Court for the Eastern District of Wisconsin, to the advantage of the Weed company.

The Pioneer grip is provided with an extra piece of chain fastened to one of the side members and with a snap hook on the loose end, attached to which piece of chain was a notice directing the purchaser to use the extra piece of chain in anchoring the grip to the wheel so as to prevent creeping, the Channon company having long contended that the Parsons patent applied only to creeping chains, while the Weed company maintained that it applied to non-skid tire chains of every character.

In the case before Judge Sanborn, the Weed interests brought testimony to show that the anchors involved were adopted solely in an attempt to evade the Parsons patent, and were abandoned when apparent need for the anchors for such purpose ceased. Other testimony was produced to the effect that the Channon company itself, during the past winter, had been shipping its Gripwell chains into Canada without providing them with anchors.

The Channon company filed numerous affidavits from users of their parts to show that the latter had adopted the anchors in good faith, and with the intention and belief that they would be used to prevent creeping.

In granting the preliminary injunction, however, Judge Sanborn said that, without deciding whether the defendant's position in this regard is well taken, he "was thoroughly convinced that he never had any such intention," adding that the "furnishing of the anchors was simply a subterfuge to evade the right of the patent owners."

K-W Ignition Sues for Consigned Goods.

On Tuesday, the 2nd inst., United States Marshall William Henkel attached a number of magnetos, coils and other ignition devices belonging the K-W Ignition Co., of Cleveland, O., which devices had been placed on consignment with Arthur H. Green, of 1686 Broadway, New York City. The attachment grew out of a suit which soon will come to trial in the United States District Court for the Southern District of New York. According to the complaint, the K-W Ignition Co., between January 12, 1911, and November 18, 1911, shipped on consignment to Green $4,542.87 worth of goods, of which $282 worth since has been sold. It is alleged that the money is being withheld by Green, and the K-W Ignition Co. asks that he be required to turn over the $282 in cash, to return the remainder of the goods, valued at $4,085, and to pay $500 damages for unwarranted detention of the goods.

Flanders Adds an Electric at $2,250.

The Flanders Mfg. Co. has added a new model to its line of electric cars. It differs from the older ones in price and, mechanically, chiefly in that it employs 30 cells instead of 24, which necessitates the distribution of the battery, 10 of the cells now being carried in the rear. This change required a slight alteration in the rear of the Colonial body design, which it is believed adds not a little to its appearance. The wheelbase has been increased by three inches; the motor is larger and a different and better controller, mounted on top of the steering column, now is employed. The price of the new model is $2,250, or $475 more than the old one.

To Produce Meeder's Motor Starter.

The Council Bluffs Auto Starter Co., capitalized at $100,000, has been organized in Council Bluffs, Iowa, to manufacture and market the engine starter invented by H. L. Meeder, who has been elected president of the new company. The other officers are: C. M. Nicholson, vice-president; George S. Wright, secretary, and C. R. Hannan, Jr., treasurer, who, with H. Doolittle, George Van Brunt and B. M. Sargent, constitute the board of directors.

Broga Fasteners on an Agency Basis.

The Broga Automatic Fastener Co., of Syracuse, N. Y., which manufactures an automobile curtain fastener of uncommon merit, and which heretofore has marketed its product through distributors located in a limited number of the larger cities, has altered its selling policy and hereafter will sell its goods on an agency basis. Such representatives are being established in all cities and towns which appear to justify such appointments.

ENGINE STARTER PATENT BOBS UP

Issued in 1895 and Soon to Expire But Inventor "Serves Notice" on Trade—How It May Apply.

That patents involving automatic engine starters were due for an airing has been almost a matter of course. Indeed, it is known that during recent months several patents have been subjected to the legal microscope in the effort to discover basic principles on which proceedings for infringement might be instituted.

The first of these patents to be brought to bear on the trade, and which promises to engage the attention of the courts, is that of Gilson W. Roth, of Indianapolis, whose patent, No. 549,213, dates back to November 5, 1895, and which, therefore, has left in it but seven months of life. Apparently on the principle that while there is life there is hope, Roth's attorneys have served notice of infringement on all persons who produce self-starters of whatever sort, notifying them that they are infringing Roth's patent and requesting that they "at once desist from further infringement and to account for and to pay over to them all profits, gains and advantages which they have derived from such manufacture and sale, as well as all damages which Roth has suffered by reason of such acts."

So far as is known, none of those on whom the notice has been served has become unduly alarmed, and none is making undue haste to "pay over his profits, gains," etc. They are calmly awaiting the suits which Roth's lawyers threaten to institute.

Roth's patent specifically covers a "gas engine igniter" applied to two-cylinder opposed motors, and assuredly was not designed with motor cars in view. Its possible merit, so far as they are concerned, is confined to a clause in the patent which provides for a "means of causing a spark when the engine is not running." In the light of present-day practice, however, the Roth igniter is almost archaic, although the apparatus for producing the spark when the motor is inoperative is not without ingenuity.

The device consists of nothing more complicated than a forked electrode carried on a rotatable shaft, which passes through an insulating bushing to the outside of the cylinder, where a hard rubber handle is provided for convenience in turning the shaft. Two flexible electrodes pass through the head of the cylinder and are so placed with relation to the forked electrode that one branch of the latter comes in contact with each of them when the rubber handle is turned slightly in a clockwise direction. Naturally, when the handle is returned to its former position, the break between the forked electrode and the flexible electrodes

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is accompanied by a spark capable of igniting the explosive mixture.

Roth's patent comprises six claims, only three of which are cited in the notice which his lawyers have served on engine starter manufacturers. They are as follows:

1. In a gas or gasolene engine, the combination with two or more cylinders, of a piston in each cylinder, the crank shaft connected with said pistons, valves controlling the supply of explosive material to each cylinder and also controlling the exhaust, a vertical shaft operating from the crank shaft, operatively connected with said supply and exhaust valves, and devices for igniting the charge of explosive materials in each of the cylinders successively, and a circuit breaker, operated by a cam for each set of cylinders to connect the circuit to cause a spark in each of the cylinders at the proper time and means for procuring a spark when the engine is not running, substantially as described.

2. In combination, the cylinder, the stationary electrodes secured in the head thereof, the reciprocating piston carrying an electrode to contact and break contact with said stationary electrodes to form a spark and supplemental means for forming a spark when the piston is inactive, substantially as described.

6. In a gas engine having two pairs of cylinders, the electrodes secured in the heads of each cylinder, the common wires connecting the electrodes of each pair of cylinders, the independent contact, the circuit through each pair of cylinders, substantially as described.

To Build Electric Cars in Chicago.

Backed, it is stated, by millions of dollars, the Chicago Electric Motor Car Co. has been formed in Chicago, Ill., for the production of what will be styled the "Chicago Electrics." It already has secured a plant at 35th and Morgan street. Frederick J. Newman, who for many years was associated with the Woods Motor Vehicle Co., Chicago, is president of the new concern, Alfred J. Leopold is secretary and Albert Meyer is treasurer. C. J. Blakeslee, who was a member of the Woods engineering staff, is the engineer of the new company, which will build a shaft-driven, Firestone-tired car, having a wheel base of 96 inches and of three, four and five passenger capacity, the bodies being of all aluminum. A new Westinghouse motor, which it is claimed will deliver 25 per cent. more power and weigh 50 per cent. less than other motors, will be employed. Deliveries of the car will begin about September 1.

Hearst to Erect an "Automobile Building."

William Randolph Hearst, the "philanthropist" and friend of the common "peepul," who, through his numerous publications in New York, Boston, Chicago, Los Angeles, San Francisco and elsewhere, has reached into the automobile trade, has laid plans to reach the same industry from another angle. He is about to erect a four-story marble-front building in New York, on the block bounded by Columbus Circle, Central Park West, Broadway and 61st street, which will contain 19 stores on the ground floor, and which will be designed especially for automobile occupancy.

RUBBER GOODS'S PROSPEROUS YEAR

Slight Decline in Sales, Large Increase in Profits Due to Tire Sales—Total Business, $35,188,295.

Despite the fact that its net sales during the twelve months ending December 31st last showed a decrease of $600,000, the year was the most satisfactory one in the history of the Rubber Goods Mfg. Co., according to the annual report rendered by its president, Elisha S. Williams, which bears date April 11th but which was circulated in advance of the annual meeting in Jersey City on that day.

The apparent illogic of the situation is explained by the fact that though the sales decreased slightly the profits for the year increased substantially—from $2,122,247.62 in 1910, to $3,500,997.23 in 1911. In 1910, the net sales amounted to $35,188,295, which was an increase of practically $10,000,000 over the sales of the previous year. Last year the total sales attained a value of $34,587,269, which slight decrease President Williams attributes to the lower selling prices which prevailed during 1911, while the profit is accounted for by the great increase in the quantity of the manufactured goods sold.

Incidentally the increase is due chiefly to the demand for automobile and other tires, the sale of mechanical and miscellaneous goods, especially those used by railroads, having fallen off. President Williams also remarks the benefits that followed the amalgamation, in March, 1911, of the selling departments of the four factories which are controlled by the Rubber Goods Mfg. Co., i. e., Hartford, Morgan & Wright, G & J and Continental-Revere. Despite the great expense which the change involved, the policy, he states, "has proven successful and great benefits should be derived therefrom in the future."

The officers of the Rubber Goods company for 1911-1912, are as follows: Elisha S. Williams, president; Lester Leland and Charles A. Hunter, vice-presidents; Edward J. Hathorne, treasurer; Samuel Morris, secretary, and John D. Carberry, assistant secretary and assistant treasurer. The directors are: Anthony N. Brady, Samuel P. Colt, Frank W. Eddy, James B. Ford, Ernest Hopkinson, Charles A. Hunter, Arthur L. Kelly, Lester Leland, Homer E. Sawyer and Elisha S. Williams.

The financial interest of the big holding company is disclosed in detail by the treasurer's report, as follows:

CONSOLIDATED GENERAL BALANCE SHEET

Assets.

Property, Plants and Investments		$26,602,908.44
Patents and Trademarks		1,570,577.89
Inventories, Manufactured Goods and Materials	$10,495,130.68	
Cash	2,043,593.70	
Bills and Accounts Receivable	6,915,644.60	19,454,368.98
Stock Owned in General Rubber Co.	1,666,700.00	
Securities owned	383,450.00	2,050,150.00
Miscellaneous Assets		292,136.03
Total Assets		$49,970,141.34

Liabilities.

Capital Stock (Prefd.)	$10,351,400.00	
Capital Stock (Com.)	16,941,700.00	$27,293,100.00
Bonds of Mechanical Rubber Co. and N. Y. Belting & Packing Co. (less amt. owned)	974,510.00	
Sinking Fund Cash in hands of Trustee	302,220.94	672,289.06
Reserve for Redemption of Bonds		454,326.12
Bills and Accounts Payable		7,164,541.31
Accounts Payable to General Rubber Co.		3,591,355.13
Reserve for Federal Excise Tax		34,433.81
Fixed Surplus (Subsidiary Companies)		2,499,218.65
Surplus		8,260,877.26
Total Liabilities		$49,970,141.34

Of the above "Assets" and "Surplus" $185,234.21 represents the ratable interest therein of minority stockholders in Subsidiary Companies of the Rubber Goods Manufacturing Company.
Contingent liabilities for certain guarantees, which are offset by corresponding contingent assets, are not included.

Consolidated Summary of Income and Profit and Loss.

Net Sales		$34,587,269.15
Earnings		3,607,895.87
Income from Investments		100,000.00
		$3,707,895.87
Less:		
Expenses of Home Office		206,898.64
Net Profits		$3,500,997.23
*Dividends	$2,159,761.93	
Depreciation on Patents and Trademarks	46,543.43	2,206,305.36
		$1,294,691.87
Transferred from Reserves to Surplus		407,653.72
Surplus for the Period		$1,702,345.59
Surplus and Working Capital January 1, 1911		6,558,531.67
Surplus and Working Capital, December 31, 1911		$8,260,877.26

*Includes $79,827.93 paid minority interests in two Subsidiary Companies.

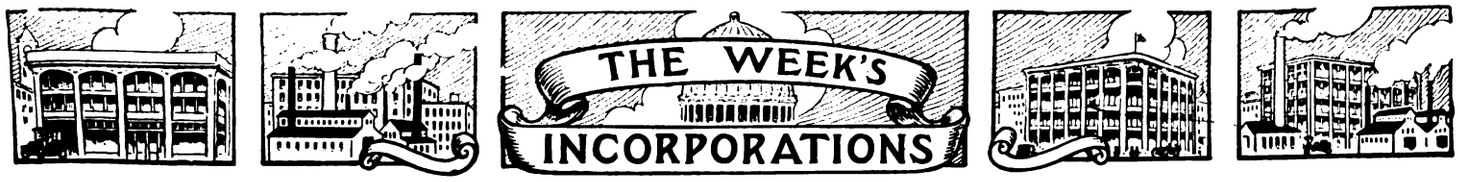
Fisk Presses Three Claims Against Jobber.

That the Automobile Tire Co., of 1625 Broadway, New York City, failed to meet two promissory notes for $3,000 each, of two and three months' duration, respectively, which were issued to the Fisk Rubber Co. for value received, is the charge made in the suit of the Fisk Co. against the Automobile Tire Co., which is on the current calendar in the United States District Court for the Southern District of New York. The Fisk Rubber Co. furthermore charges that $3,272.95 is due on a bill of goods, which in total amounted to $54,029.95 and which was contracted between September, 1910, and July, 1911. All these claims are merged in one action, in which the Fisk Co. sues for $9,305.45 plus interest and costs. The Automobile Tire Co. disputes the claim and by its refusal to pay brought on the legal proceedings in the Federal court.

To Make Wheel Parts in Albion.

Mark Merriman, vice-president of the Hayes Wheel Co., of Jackson, Mich., has purchased a factory building in Albion, in the same State, and will engage in wheel manufacture on his own account. He will devote himself more particularly to the production of wheel parts than of complete wheels.

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Delmar, Del.—F. G. Elliott Co., under Delaware laws, with $50,000 capital; to deal in motor cars, etc.

Springfield, Mass.—Maynard Rubber Corporation, under Massachusetts laws, with $5,000 capital. Corporators—Edward W. Maynard, Charles W. Shaw.

Augusta, Me.—Auto Tractor Co., under Maine laws, with $100,000 capital; to manufacture automobile tractors. Corporators—L. J. Coleman and others.

Galion, Ohio—Cleveland-Galion Motor Truck Co., under Ohio laws, with $5,000 capital; to deal in automobiles. oCrporatrators—James Smith and others.

with $100,000 capital. Corporators—I. P. Carr, E. Kerchner, E. B. Coil, J. H. Gosling.

Minneapolis, Minn.—Parker Garage Co., under Minnesota laws, with $10,000 capital; to operate a public garage. Corporators—J. G. Pelton, E. H. Schoemann, Fred Dexter.

Orangeburg, S. C.—Carolina Motor Co., under South Carolina laws, with $3,000 capital; to deal in motor vehicles. Corporators—C. A. Stroman, Jesse M. Ziegler and Noah Ziegler.

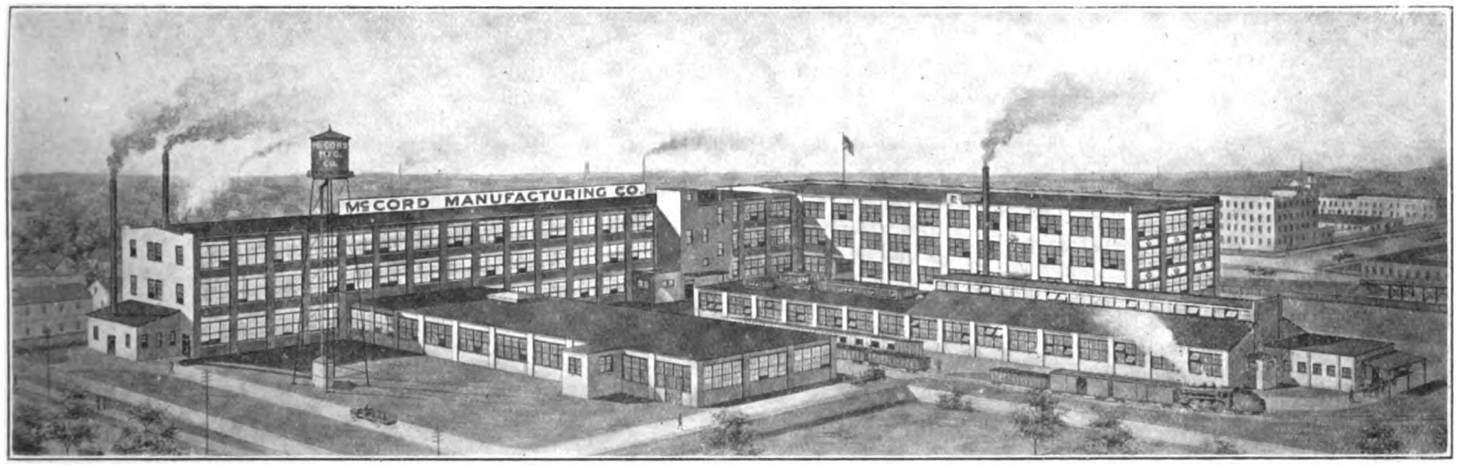
Salt Lake City, Utah—Salt Lake Automobile Co., under Utah laws, with $25,000 capital; to deal in automobiles. Corpora-

Kinley, N. D.—Hammer-Condy Co., under North Dakota laws, with $50,000 capital; to deal in motor vehicles. Corporators—O. H. Carlson, H. P. Hammer, Martinus Norswing.

Detroit, Mich.—Wolverine Tire Co., under Michigan laws, with $25,000 capital; to manufacture automobile tires. Corporators—Ernest R. Robinson, Perry G. Robinson and Henry Smith.

Wilmington, Del.—Automobile Tire Filling Co., under Delaware laws, with $100,000 capital; to manufacture tire filling. Corporators—M. L. Rogers, S. E. Roberson, H. W. Davis.

McCORD MANUFACTURING CO.'S PLANT IN DETROIT AFTER ITS ENLARGEMENT



Contains 110,000 square feet of floor space and employs 850 men. Not to mention lubricators, gaskets and other automobile and railroad parts, it has a daily output of 300 radiators

Logan, Ia.—Seabury-Carson Co., under Iowa laws, with $48,000 capital; to deal in motor cars, etc. Corporators—D. H. Seabury, C. W. Carson, A. W. Gainess.

Indianapoils, Ind.—Morris Motor Sales Co., under Indiana laws, with $10,000 capital; to deal in motor cars. Corporators—T. H. Morris, P. H. Krauss, D. S. Morris.

Florence, S. C.—J. D. Bridges Co., under South Carolina laws, with $8,000 capital; to deal in motor vehicles. Corporators—J. D. Bridges, W. J. Whilley, E. T. Hickey.

Wilmington, Del.—Postles-Prouse Co., under Delaware laws, with $50,000 capital; to deal in automobiles. Corporators—G. P. Postles, Shanley D. Prouse and others.

Chicago, Ill.—Motor Sales Co., under Illinois laws, with $10,000 capital; to manufacture motors, etc. Corporators—Irwin N. Walker, Frederick L. Coff, M. M. Miller.

Los Angeles, Cal.—California Automobile Timetest Co., under California laws,

tors—J. E. Langford, Ashby Snow, A. L. Taylor.

New York, N. Y.—Yellow Taxicab Co., under New York laws, with $5,000,000 capital; to operate taxicabs. Corporators—L. Robinson, B. Bag, S. J. Trainor, all of New York City.

Minneapolis, Minn.—Speed Punctureless Tire Co., under Minnesota laws, with $300,000 capital; to manufacture automobile tires. Corporators—W. H. Schafer, E. D. Mooar, J. F. Ernster.

Gary, Ind.—Motor Bus Transfer Co., under Indiana laws, with $20,000 capital; to operate a general transfer business. Corporators—J. F. Grantham, E. M. Stults and J. W. Lyddick.

Ada, Minn.—Norman County Automobile Co., under Minnesota laws, with $50,000 capital; to deal in automobiles. Corporators—Peter Matson, Louis Heintze, J. Ahlers and others.

Toledo, Ohio—Dennis Motor Co., under Ohio laws, with $25,000 capital; to deal in motor cars. Corporators—C. H. Dennis, C. W. Close, Allen R. Reid, R. S. Woodrow and John G. Meister.

Spokane, Wash.—Empire Tire Repair & Supply Co., under Washington laws, with $5,000 capital; to operate a tire repair business. Corporators—M. W. Bean, H. E. Frazier, J. G. Kilmer.

East Orange, N. J.—Kadix Newark Motor Truck Co., under New Jersey laws, with $200,000 capital; to manufacture motor trucks. Corporators—G. F. Kallberg, L. L. Dann, R. M. Colburn.

Indianapolis, Ind.—Westerfield Engine Starter Co., under Indiana laws, with $5,000 capital; to manufacture motor starters. Corporators—G. G. Westerfield, C. F. Hunt and J. E. Spaan.

Springfield, Ill.—Automatic Motor Devices Co., under Illinois laws, with $5,000

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capital; to manufacture automobile accessories. Corporators—Samuel S. Holmes, Peter J. Hower, Walter D. Hawk.

Dover, Del.—Shur-Go Starter Co., under Delaware laws, with $200,000 capital; to manufacture engine starters. Corporators—J. E. Taylor, T. C. LeFevre, New York City, and J. M. Satterfield, Dover.

Middletown, Ohio—Middletown Motor Car Co., under Ohio laws, with $15,000 capital; to deal in motor cars. Corporators—D. N. Gingerick, L. F. Steckrath, W. M. Warner, H. S. Mitchell, C. D. Hall.

Utica, N. Y.—Xargil Kerosene Engine Co., under New York laws, with $100,000 capital; to manufacture internal combustion motors. Corporators—B. F. Gilbert, G. A. Frisbie, J. A. Xargil, all of Utica.

Greenwich, Conn.—Porto Rico Motor Co., under Connecticut laws, with $150,000 capital; to deal in motors. Corporators—Milton A. Mills, Jr., Loring J. Whiteside and Edward J. Ryan, all of New York City.

Wilmington, Del.—Jiffy Auto Curtain Co., under Delaware laws, with $100,000 capital; to manufacture automobile tops and curtains. Corporators—E. E. McWhiney, W. J. Maloney, N. B. Coffin, all of Wilmington.

Rochester, N. Y.—Pembroke Manufacturing Co., under New York laws, with $50,000 capital; to manufacture automobile supplies and accessories. Corporators—C. J. Pembroke, W. P. Pembroke and W. J. Fellows.

Dover, Del.—Moon Motor Car Co., of Philadelphia, under Delaware laws, with $100,000 capital; to deal in automobiles. Corporators—L. T. Edwards, Philadelphia; E. A. Edwards and J. M. Frere, Wilmington.

New York, N. Y.—Charles H. Tucker Co., under New York laws, with $100,000 capital; to manufacture tires, tubes, etc. Corporators—Charles H. Tucker, Edward R. Wood and Henry W. Solomons, all of 1974 Broadway.

Los Angeles, Cal.—Los Angeles Motor Car Manufacturing Co., under California laws, with $20,000 capital; to deal in motor cars. Corporators—J. B. Morrow, Paul Brown, Jr., O. B. Hutchings, J. R. Fouch, J. Murphy.

Riverhead, N. Y.—Vail-Campbell Co., under New York laws, with $5,000 capital; to conduct a general automobile repair business. Corporators—Hilaire E. Campbell, Raymond H. Vail, Katherine Campbell, all of Riverhead.

Dayton, Ohio—Dayton Auto Delivery Co., under Ohio laws, with 125,000 capital; to operate a general transfer business. Corporators—John C. Hamilton, Sol Flatau, W. H. Spickler, Dr. H. C. McClelland and E. V. Menier.

Camden, N. J.—Ceyton-Filles Co., under New Jersey laws, with $3,000 capital; to manufacture automobiles. Corporators—Howard L. Merrick, John A. Kinney, William Williams, Thomas W. Shora, all of Collingswood.

OLD TRADESMEN IN NEW PLACES

Some Resign and Many Climb to Higher Positions—Transfers Reported from All Parts of the Country.

P. J. Tieber has been appointed manager of the Lozier branch in Cleveland. He succeeds W. H. Kirkpatrick, resigned.

E. N. Sanders, assistant manager of the Moon Motor Car Co.'s branch in Chicago, has been promoted to the management of that establishment.

George L. Sullivan, one of the American Locomotive Co.'s traveling staff has been promoted to the post of supervisor. His particular supervision will extend to the Alco branch houses in Chicago, Boston and Montreal.

Ralph W. Keeler has been appointed general manager for the Miller Car Co., which recently was organized in Detroit to manufacture the Miller car. Previously Keeler was identified with the Hupmobile sales organization.

L. E. Whitmore has been appointed sales manager for the Franklin Automobile Co. for the States of Louisiana, Arkansas, Texas, Oklahoma, Arizona and New Mexico. He will make his headquarters in Dallas, Texas.

R. H. Schmittdiel has been appointed assistant sales manager for the Empire Automobile Co., of Indianapolis. He has had ripe experience, having been connected with the sales staffs of the Brush and Regal establishments for several years.

W. J. St. Onge, formerly with the Dean Electric Co., of Elyria, O., has been appointed advertising manager for the Anderson Carriage Co., of Detroit, Mich. He succeeds Hal Smith, who resigned to join the electric vehicle staff of the General Motors Company.

Charles W. Garratt has been elected secretary and treasurer of the Federal Motor Truck Co., of Detroit. For twelve years Garratt was associated with the American Radiator Co., and later served as assistant treasurer and as a director of the United States Heating Co.

A. L. Tisch, of New York, has been appointed advertising manager for the Haynes Automobile Co., of Kokomo, Ind. In addition to his advertising experience, Tisch has the advantage of actual mechanical training, which will serve him to good purpose in his new position. He succeeds A. A. Franklin.

F. A. Babcock, who formerly was connected with the Franklin Automobile Co, has been appointed Northwestern sales manager for the R-C-H Corporation, of Detroit. He will have his office in Minneapolis, and his territory will comprise Minnesota, North Dakota, South Dakota, Montana and Northern Wisconsin.

After having been identified with the automobile business almost since its inception, R. T. Houk, who for the past year has been sales manager for the Stoddard-Dayton division of the United States Motor Co., has resigned that office to engage in a wholly different business. He will become general manager of a large mill in Ohio, of which he has been a director for several years.

W. H. Cameron, former chief engineer for the Willys-Overland Co., has engaged with the Flanders Mfg. Co., of Pontiac, Mich. He will have to do chiefly with the Flanders gear work but will also have a hand in the designing of Flanders motorcycles and electric cars. Despite rumors to the contrary, Cameron has nothing to do with the Universal Truck Co., of Detroit.

Tom O. Jones, one of the three men who constituted the Hupmobile globe-girdling export expedition, has been appointed assistant export manager for the R-C-H Corporation, of Detroit. Jones is a former newspaper man, and his training in that field, together with experience gained during the globe-girdling feat, will serve him well in prosecuting his new duties.

W. J. Teagan, who for twelve years has handled New England territory for the Goodyear Tire & Rubber Co., of Akron, Ohio, and who latterly has served as manager of its Boston branch, has been promoted to the post of district manager for New England. The vacancy created by Teagan's elevation has been filled by the appointment of C. M. McCreery, formerly with the Goodyear factory in Akron.

Following the policy adopted by the Franklin Automobile Co. of locating district sales managers in the particular territory in which their work lies, L. R. Gindrat has been appointed sales manager for that company's Southern district, with headquarters at Atlanta, Ga. The territory which he will supervise includes North Carolina, South Carolina, Georgia, Alabama and Florida. Previously, Gindrat was manager of the Franklin branch in Baltimore.

Chicago Trade Wants Fall Truck Show.

Among other plans, that super-active organization, the Chicago Automobile Trade Association is anxious to promote a commercial vehicle show in the Coliseum in the fall of the present year, and has taken steps in that direction. Whether or not the event ever will come to pass is in doubt, however, for though formal application for a sanction has been made to the National Association of Automobile Manufacturers, at the New York headquarters it is stated that it is unlikely that a sanction will be issued for such a purely local affair.

Newark Tire Plant Moved to Buffalo.

The entire equipment of the Newark Rubber Co., of Newark, N. J., has been purchased by the Frontier Tire and Rubber Co., of Buffalo. When it is installed, the added machinery will, of course, greatly increase the facilities of the company.

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The Klemm Auto Co., of Davenport, Ia., has changed its name to Union Motor Co.

Frank Reckenthaler has taken over the garage formerly operated by Bullock & Bauman, at Cushing, Iowa.

W. A. Sawyer has purchased the Holloway Garage, in Bucyrus, Ohio. He will handle several popular priced cars.

Q. J. Smith, who was the Ford agent at Warren, Pa., has sold his agency business to the Wilson Taxicab Co. of the same city.

Under the style Collins Auto Repair Co. a new concern has "opened up" in Palatka, Fla., at 712 Lemon street. Elmer Collins is in charge.

The Probey Carriage Co., 1230 Wisconsin avenue, Washington, D. C., has taken on automobiles. It is handling the Michigan and Detroiter cars.

A branch of the United States Tire Co. was opened on April 1 at 406 West Ninth street, Des Moines, Iowa. W. H. Mesenbrink is the manager.

The Beehler & Odgen Automobile Co. is building a big salesroom and service building on Lexington street. Baltimore, Md. Krit cars are handled.

Clover & Allen have inaugurated a garage and repair business at 231 South Eleventh street, Lincoln, Neb. They have the agency for the Inter-State line.

C. G. Freeberg, owner of the Commercial Hotel at Decorah, Ia., has added automobiles to his hostelry business and taken the agency for Nyberg cars.

The Acorn Tire & Supply Co. has established itself at 25 William street, Newark, N. J. R. D. Crocker, president of the company, is in active charge of it.

Howard B. Hewitt and Floyd Pease have opened a salesroom and repair shop in North Yakima, Wash., where they will handle Reo and Apperson cars.

Judge F. W. Jenkins, of Eau Claire, Wis., has leased the premises 124 East Central street and opened a public garage. It will be managed by Peter Pangbourn.

Rownd's Garage, in Grand Island, Neb., has changed hands. J. H. Jarvis and O. J. Bauder, the new owners, will operate under the style Jarvis-Bauder Auto Co

Peter P. and T. K. Swanson have opened a garage and salesroom at 2101 Monroe street, Spokane, Wash. They have the distributing agency for Sullivan commercial vehicles.

Charles J. Gray, who has a bicycle store and cutlery business in Gloucester, Mass., has branched into the automobile line. He is building a garage large enough to accommodate 100 cars.

Fred Clasby and George Hoffman have formed a partnership and opened a repair shop on Ninth street, Marysville, Kan. They will do business under the style of Clasby & Hoffman.

The Market Garage & Machine Co. is the style of a new company which is building a garage at 1035 Market street, Parkersburg, W. Va. L. G. Meed and E. W. St. Clair are interested in the company.

The Colorado Rubber Co., of Denver, is erecting a modern four-story fireproof building at 1825-1831 Lawrence street, which will be ready for occupancy July 15th. It wil lrepresent a cost of $52,000.

A factory branch and service deparement is being erected for the Peerless Motor Co. of New England, distributors of Peerless cars, at 773 Broad street, Providence, R. I. The management will be in the hands of J. W. Breeze.

Herman Tietgen has bought the Monroe Garage, at Monroe street and Sharp avenue, Spokane, Wash., from its former owners, I. N. Benson and J. B. Ballard. He formerly was manager of the Lake City Garage at Coeur d'Alene, Idaho.

The Stoddard-Dayton Motor Co. of Hartford has been incorporated under Connecticut laws, for the purpose of dealing in Stoddard-Dayton cars. Walter D. King, of Hartford, is president, and Wells H. Wetherell secretary and treasurer.

Departing from the automobile district, the W. M. Laird Co., Pittsburgh distributor of Pullman cars, has opened a salesroom in Liberty avenue, which is in the downtown district. It is stated that other companies soon will follow the example.

The Goodyear Tire & Rubber Co. has leased the building now being erected at 1016 14th street, Washington, D. C., and will take possession about July 1st. At that time the Goodyear branch, of course, will remove from its persent location, 1026 Connecticut avenue.

The Empire Tire Repair Co., of Spokane, Wash., has been reorganized and will do business under the incorporated name Empire Tire Repair and Supply Co., at 1007 First avenue. M. W. Bean, J. G. Kilmer and H. E. Frazier are the men who compose the company.

H. W. Marshall has disposed of his interests and retired from the Marshall-Parsons Co., of Washington, D. C., agent for the S. G. V. car. The business will be continued by Frederick Parsons. Marshall has removed from Washington and gone into business at Fort Wayne, Ind.

Prosperity having smiled on him, H. G. Raymond is building a new garage in Fort Wayne, Ind., where he will display Imperial and R-C-H gasolene cars and Waverley electrics. The structure will be one story high, covering 7,680 square feet, of fireproof steel and concrete construction.

The R. & L. Co., of New York, metropolitan distributor of Garford cars and trucks, has established a branch in Newark, N. J., at 987 Broad street. It is in charge of Jacob A. Rainier. Ultimately it is the purpose of the R. & L. Co. to erect a four-story sales and service building in Newark.

At a total cost of about $60,000, the Pittsburgh-Chalmers Co., distributor of Chalmers cars in the Smoky City, is preparing to erect a building on Louisa street, opposite the entrance to Forbes Field, which will be used as display rooms, business offices and service department. A. C. Simler is president of the company.

Edward L. Graves, formerly with the Studebaker Corporation and the American Motor Co., and Otto R. Michel, of Sandusky, Ohio, have formed the Alco Motor Car Co., in Cleveland, where they will handle the Alco cars and trucks. Graves is president and general manager of the company and Michel vice-president and treasurer.

The partnership of Lee Arris and Mrs. Adele B. Dee, who operated the Pacific Garage in Turlock, Cal., is to be dissolved upon the petition of Mrs. Dee. In her application to the court she states that she fears that Arris will do bodily harm to her husband, and she asks that her partner be ordered to pay all outstanding debts of the firm and divide the remaining money with her.

The Dennis Motor Co., of Toledo, has been incorporated, under the laws of Ohio, with $25,000 capital stock, and has taken over the business of the Rambler Motor Sales Co. in that city, and thereby acquired the agency for the Rambler car, which will be handles in conjunction with Alcos, Cinos and Detroit electrics. The incorporators of the Dennis company are H. H. Dennis, G. W. Close, Allen E. Reid, R. S. Woodrow and John G. Meister.

Recent Losses by Fire.

Ogdensburg, N. Y.—Hannan & Henry's garage and 80 automobiles destroyed. Loss, $200,000.

Brooklyn, N. Y.—M. F. Marlborough's repair shop at 470 Clermont avenue, gutted. Loss, $20,000.

Hyannis, Mass.—Cape Cod Automobile Co.'s garage and 15 cars destroyed. Loss estimated at $25,000.

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CONSPIRACY CHARGE IN CAB SUIT

Mysterious Stock Transactions Figure in Damage Suit—Receivership Asked for New York Taxicab Company.

That all was not as it should have been in the affairs of the New York Taxicab Co.—which concern not so long ago was absorbed by the Mason-Seaman Transportation Co., of New York City—is made evident by papers on file in the County Clerk's office entitled Mrs. James A. Bailey vs. New York Taxicab Co. According to the statement and affidavits submitted in the name of Mrs. Bailey, stock transactions of somewhat mysterious character took place, culminating in what the complaint terms a "conspiracy to defraud the public."

The particular transaction which is made the basis of the pending suit is one in which Mrs. Bailey is said to have been induced to buy 2,000 shares of the Taxicab Co. stock, paying therefor $10,000. Charles Mascart, who is made a co-defendant in the suit, is said to have been the dominating spirit in the scheme.

Mascart, who lives in Paris, is alleged to have originated the scheme under which Mrs. Bailey and other stockholders lost hundreds of thousands of dollars. The suit asks that Mascart be compelled to account for all the profits he made out of the scheme and seeks the appointment of a receiver for the New York Taxicab Co., with authority to dispose of the company's property and divide the assets among the stockholders.

The suit was brought in the name of Mrs. Bailey just before she died recently. Her brother and business manager, Joseph T. McCaddan, obtained an order in the Supreme Court to examine Mascart and the officers of the taxicab company concerning her allegations of a conspiracy to defraud. The order was served on Charles P. Callaghan as president of the New York Taxicab Co, but Supreme Court Justice Platzek vacated the order last week upon Callaghan's statement that he resigned last year.

In his petition for the order, McCaddan said that he would be able to prove by Mascart that the latter had formed a syndicate or pretended corporation which bought taxicabs at a low price and made secret profits to a large amount by selling the taxicabs to the New York Taxicab Co.

William P. Maloney, counsel for Mrs. Bailey, said in an affidavit that she bought her stock at $5 a share when the stock was first offered for sale, and the defendant corporations were fraudulently used to obtain moneys from the public. He said that after Mascart and others associated in the pool with him had sold hundreds of taxicabs at a great profit they caused a reorganization of the defendant companies for fraudulent purposes.

The complaint says that it was represented to the public that the New York Taxicab Co. owned more than 500 taxicabs and would make a profit of $945,000 a year out of them. It is alleged that Mascart and others have transferred 120 taxicabs to unidentified persons and that they have had a liquidator of the English corporation appointed to divert the assets from the stockholders of the New York corporation.

R. P. Henderson's Associates Made Known.

R. P. Henderson, president-to-be of the embryo Henderson Motor Car Co., of Indianapolis, has been able to prosecute his plans with more dispatch than at first was thought possible. They are already so well in hand that his new company probably will be incorporated early next week and be ready to take up the manufacture of the Henderson car early in July. The car itself will be well within the $1,200 class. It will mount a 35-horsepower motor, will have center control, left-hand drive, transmission on rear axle, a wheelbase of 116 inches, and 34-inch wheels. It will be built in two and five-passenger models, after designs by Charles S. Ricker, who will be the new company's designer and chief engineer.

R. P. Henderson's associates in the new venture also have been made known, and, contrary to earlier impressions, Charles P. Henderson, president of the Henderson Motor Sales Co., will be one of them. He will hold no office, however, and will devote his activities to the Cole company, whose general sales manager he will become when the merger is effected. At present he holds no stock in the Cole company, but it is likely that he shortly will become possessed of a block of it. R. P. Henderson's other associates in the new enterprise are L. Carter, of Jesup, Ga., president of the Henderson Motor Sales Co., who also is heavily interested in the Cole company and E. E. Rogers, of Indianapolis, who has been interested in the Sales company, but has no interest in the Cole corporation. R. P. Henderson himself will surrender his holdings in the Cole company to J. J. Cole, its president.

Hartford Garages Raise Their Rates.

Six of the principal garages in Hartford, Conn., have joined in announcing an increase in storage rates, which will date from May 1st. Thereafter the charge for open cars of 112-inch wheelbase, or less, will be $15 per month; for open cars of greater wheelbase, $20 per month. The charge for limousines and all other closed cars, regardless of their dimensions, will be advanced to $25 per month. The rates, of course, include washing and polishing.

Day Leases Factory at Detroit.

The Day Automobile Co., of Detroit, manufacturer of the Day utility car, a convertible vehicle, has leased for five years the factory building recently erected at 25 East Milwaukee avenue in that city. It is a two-story brick structure which will afford 20,000 square feet of floor space.

ALEXANDER STRAUS DIES AT DESK

Pioneer Tire Maker Suddenly Succumbs to Heart Disease—Prominent and Useful Parts He Played in Industry.

Alexander Straus, one of the genuine veterans of the tire industry, died suddenly on Tuesday last, the 9th inst., in the office of the Brander Auto Tire Co., 1987 Broadway, New York, with which concern he lately has been identified. He was dictating a letter when he fell from his chair, due to heart disease, with which he long had suffered.

Straus was born in Germany in 1852, and after graduating from the University of Frankfort he came to this country, soon thereafter engaging in the rubber business When the pneumatic tire first appeared, in 1889, it attracted his attention at once, and thereafter, with a few short intermissions, he applied himself assiduously to its perfection. He early invented a single-tube bicycle tire, which was produced by the New York Belting & Packing Co., and later developed other tires for the Newton Rubber Works, of Newton Upper Falls, Mass. He was in and out of the tire business on several occasions, and during the course of his activities assisted in founding both the Goodyear Tire & Rubber Co. and the Hardman Tire & Rubber Co., of which latter Joseph Straus, his eldest son, is president. His other two sons also are with the Hardman company.

Straus knew rubber to the last analysis, and, although in poor health during the last five years, it occupied most of his thoughts. Latterly he maintained that all present-day automobile tires are improperly constructed—that they should be made with a layer of rubber between each layer of fabric, and he had been developing a tire of that sort. It was also one of his favorite beliefs that the reason why one tire will give but 3,000 miles of service while another of the same brand will give 13,000 or 23,000 miles, is proof of the imperfect or otherwise defective construction of the short-lived tire. In addition to his three sons, Straus leaves a widow and two daughters.

To Enlarge Warner Plant in Beloit.

The Warner Instrument Co. has let contracts for the erection of an addition to its already large plant in Beloit, Wis. The new structure will be 100 x 100 feet and will be of the same brick and concrete construction as the present building.

Two More American Cars Enter England.

Two more American cars have entered the British market, the Metz and the Pathfinder. The former is handled by the British Lion Motor Car Co. and the latter has been put in the hands of C. M. Nankivel, both of London.

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THE MOTOR WORLD

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THE OVERLOADING AND OVERSPEEDING EVILS.

There never has been a time since the manufacture of motor trucks was commenced when truck manufacturers, as a class, did not more or less strenuously object to the overloading of their machines; and in this they naturally have been actively supported by the tire people. Within the last year or two, however, there has been more concerted action in this direction than ever before. Manufacturers of trucks and of tires are getting together and there is a strong tendency not merely to object to both overloading and overspeeding but to enforce such objections by the withdrawal of guarantees.

In the effort to eliminate, or at least to minimize, this evil, there is absolute necessity for co-operation that is consistent. For instance, what good does it do for a manufacturer to formulate rules if the sales agent does not back him up to the extent of enforcing those rules to the best of his ability? The very least an agent can do is to refrain from encouraging overloading and excessive speeds. Nevertheless it is an open secret that trucks placed on demonstration in charge of drivers employed by sales agents often are handled in a way that would arouse the unbounded indignation of the agent if the same thing were done by the purchaser of a truck under a guarantee. It is well known that demonstrating drivers have been paid bonuses in addition to their regular pay for tonnage hauled in excess of a stipulated amount, and that gross overloading and reckless speeding through the streets have resulted. The mere fact that a new truck under the care of an expert mechanic will stand up and make records that may be the direct cause of the sale of the machine does not justify the practice, however well it may speak for the capacity of the car for taking abuse. The prospective purchaser is led to believe that the machine is capable of doing more than he has any real right to expect, and he is placed in danger of having to pay a maintenance cost that he has not been led to anticipate; competing trucks that are normally loaded and carefully driven are placed in an unfair light and made to appear inferior, when such may not be the case; drivers who are to take charge after the conclusion of the demonstration period are encouraged to attempt similar stunts; and there is a strong element of danger to the public, as well as to the truck itself in its reckless career through city streets.

It is undeniable that when an agent knows he can take chances with a strong probability of pulling through safely, the temptation to try to make a competitor's machine appear at a disadvantage is extremely strong—especially if it is known that the competitor is likely to follow the same tactics. It is not fair competition, however; it is entirely contrary to the spirit of co-operation among truck makers themselves and between truck makers and the tire people that many fair minded concerns are now endeavoring to promote.

THE POPPET VALVE AS A GOOD OLD STAND-BY.

The poppet valve is an old, established institution, maligned in some cases, badly treated in most cases and poorly constructed in others. But all of this does not detract from the fact that it can be made, and is made, so that its operation is as "sweet" and as silent and as efficient as can be desired. That is to say, some poppet valve mechanisms approach the ideal in these respects. A great many fall short of it, however, though it apppears that if those manufacturers who seek to better their mechanisms would devote as much time and study and money to perfecting their poppet valves as the manufacturers of other types of valves find it absolutely necessary to devote to them in order to make them operate at all, they would have little difficulty in reducing noise and promoting efficiency. Some manufacturers really do give as much attention to their poppet valves as the workers in the other field devote to their slide or sleeve or rotary valves, and the fact that they reap benefits in proportion to their exertions should serve as a moral for others.

All of which is merely by way of pointing out that the poppet valve, when properly and painstakingly constructed, really is a good valve despite disparaging statements which have been made regarding it. There is no doubt that the poppet-valveless motor is a great thing; it marks a distinct advance in engineering practice, though it would seem that too soon have some engineers decided that something better than the poppet valve is necessary. But in all probability both types of engine have a long life before them despite the apparent imminence of the Deisel engine and other engines; neither type has reached the stage beyond which advance is impossible, and in the mean time it is meet that the poppet should receive at least at much attention as is being devoted to other types of valves in the hope of discovering something so infinitely better from every point of view that the poppet valve will be completely outclassed. In other words, it is well, first, actually to reach the limit in perfecting the poppet valve before finally turning too quickly or too sharply to other and newer mechanisms.

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IMPROVING LOCAL CONDITIONS

Utica Dealers' Association Points the Way —Price-Cutting and Used Car Problems Simplified.

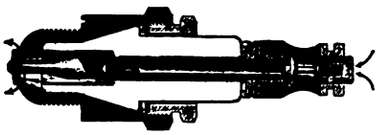
Although in existence but three months, the Utica Automobile Trades Association, of Utica, N. Y., appears to have accomplished far-reaching benefits. In the handling of even such aggravating problems as the used car, progress has been made. How the dealers are working together and what they have achieved was outlined at the annual banquet of the association last week in the address of its president, H. D. Gouse, who, among other things, said:

"First, the dealers have agreed to sell cars and equipment at list price. In addition to the price cutting on new cars, it was learned that a most deplorable condition existed respecting allowance on used cars. A committee was appointed by your association to consider and report as to fair allowances for used cars when taken in exchange. The work of investigating that matter and the establishing of a used car schedule involved an enormous amount of work on the committee. The committee, in arriving at their prices for used cars, based their report on the market value of the used car and recommended a schedule of prices at which the dealer could take in used cars and sell same without a loss, and at the same time make his legitimate profit on the new car which he sold. The report of the committee was adopted, and to-day each dealer is submitting the same price for a used car, which, as you well know, will prevent the owner from peddling around amongst the different dealers and getting each succeeding one to make him a greater allowance for his car, which, in the majority of the cases prior to the existence of the association, far exceeded the market value of the car.

"It must be appreciated by each of you that the success of an undertaking depends upon the loyal support and hearty co-operation of each one of its members, and I feel confident that such support and co-operation, which is essential, is given and will continue to be given by each member. In addition, it means hard work and plenty of it for each one of you. Another thing which appears to me to be necessary to success and the holding of the respect of the customer is that each one be treated rigidly alike. Almost every good car is represented in Utica by some one of its dealers, and, if you believe in the article which you are selling and it is priced right, there is no reason why you should not secure the list price. It is my contention, and I believe that each one of you agrees, that if you make a cut in the price or throw in a lot of extras, you are telling the customer that your asking price was too high. If a customer purchased a car at cut price, there was a question in his mind whether he had secured the lowest figure, and he left with less respect for you than had you not made the sale to him, because of your maintaining the price and treating each one alike."

Here's the "Air-Cooled" Spark Plug.

While the location of the spark plug on the engine is by no means standard, and it may be taken as axiomatic that where there are six manufacturers who prefer the central location of the plug because of the increased speed of flame propogation when plugs are so located, there are half a dozen who adhere to the custom of placing the plug in the valve pocket, where the cool gases from the inlet valve prevent undue temperatures. The advantages which obtain from both locations may be combined in a motor with centrally located plugs, provided the plugs used are of the "air-cooled" variety recently placed on the German market by Sorge & Sabeck, of Berlin; that is, if the statement of the makers can be taken as authentic. The plug, as shown by the accompanying illustration, while more or less of the conventional pattern,



GERMANY'S "AIR-COOLED" PLUG

incorporates somewhat of an innovation. The central metal spindle, which carries the current to the interior of the cylinder, is bored for about three-quarters of its length, and at the point where the hole terminates two small holes extend to the outside and provide an escape for the air which is drawn through the spindle. A check valve, housed in the brass cap of the plug, permits the free ingress of a certain amount of air on the suction stroke of the motor, but closes tightly to prevent the escape of the gases during the working stroke. The air so admitted, it is claimed, maintains the plug at a temperature much below that of the ordinary centrally located plug, and, moreover, tends to prevent the formation of carbon.

Mais Wants Pay for Wrecked Trucks.

Two suits, each for $4,000, have been filed in the Indiana Superior Court by the Mais Motor Truck Co., of Indianapolis, against the Cincinnati, Hamilton & Dayton Motor Railroad Co. and the Terre Haute, Indianapolis & Eastern Traction Co., respectively, the proceedings growing out of the destruction of Mais trucks by cars operated by the respective companies. In the suit against the railroad company, it is alleged that the flagman at the crossing signaled to the driver of the truck that all was safe when results proved otherwise. In the action against the traction company, the point involved is more finely drawn and more unusual. It appears that while driving in the trolley tracks the chauffeur of the Mais truck signaled to the motorman that he could not pull out of the tracks on account of their slippery condition. The trolley car, nevertheless, did not slacken its speed and the Mais truck was struck from behind and demolished, the driver escaping only by a nimble leap.



April 13, New York City—Annual Motor Truck parade under the auspices of the New York Motor Truck Club.

April 14, San Jose, Cal.—Track races promoted by J. Alex. Sloan.

April 29-May 4, Burlington, Vt.—Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal.—Santa Monica road race.

May 15-18, Chicago, Ill.—Chicago Motor Club's reliability run for commercial vehicles.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

Melbourne in Market for Electrics.

The municipality of Melbourne, Australia, is inviting bids for three electric vehicles, which bids must be received on or before May 15th. One of the vehicles desired is a single-seated runabout, and the other two are wagons of the open body type, designed to carry loads of 1,000 and 2,000 pounds, respectively. In each case, the specifications call for the use of Edison storage batteries.

Leather Exports Show Slight Increase.

During February, 1912, $8,430 worth of leather for automobile use was exported from the United States, as compared with $7,902 worth in the same month of 1911. For the eight months ending February, the figures are $60,884 and $59,785, respectively, indicating that the trade in this line of merchandise practically is at a standstill.

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MILWAUKEE GETS THE VANDERBILT

Also the Grand Prize Race—But Vanderbilt Must Be No Curtain-Raiser, Else Sanction May Be Denied.

Not New York, not Georgia, not even Texas, will furnish the setting for the eighth Vanderbilt Cup Race, for the state of Wisconsin, represented by the city of Milwaukee, which so suddenly entered the bidding, presented so many claims of superiority and real substance, that the classic event for the first time will go West. New York could not provide military protection, Georgia cried "enough," and Texas—that is Dallas, which sought the honor—could not offer attractions that compared with those presented by the Milwaukee Automobile Dealers' Association. As a result the executive board of the Motor Cups Holding Company, on Tuesday, the 9th inst., formally awarded both the Vanderbilt and the Grand Prize events to the Milwaukee promotors, the only stipulation for the running of the events being that the Vanderbilt race be run under sanction granted by the Contest Board of the A. A. A., while the Grand Prize race be run under sanction issued by the Automobile Club of America, which gave birth to the Grand Prize as a matter of spite at a time when the club was at loggerheads with the A. A. A.

The dates on which the two races will be run have not yet been definitely settled. It is understood, however, that the Vanderbilt will be decided on Labor Day, September 2nd, if it is possible. At any rate, the race will be run sometime between the 1st of September and the 5th of October. It is to be hoped that the Grand Prize race will not be run so close to the Vanderbilt race as to lessen the interest in the latter, as was the case last year at Savannah, Ga. Indeed, it is whispered that there is a chance that the Contest Board of the A. A. A. will refuse to sanction the event unless the dates of the two contests are far enough apart to insure individuality for the Vanderbilt race. Such action on the part of the Contest Board will prevent the Vanderbilt again assuming the role of a mere curtain-raiser for the one-time "spite race."

Oldfield, Reinstated, to Race Again.

Although he gave out that he was through with racing forever, Barney (Berna) Oldfield, like many another driver before him, has decided to "come back" after all now that his suspension by the American Automobile Association has been commuted to expire on April 30th. Negotiations have been completed between him and E. E. Hewlett, who is the Pacific Coast representative for Fiat cars, whereby he is to drive a 90-horsepower Fiat in the Santa Monica road races, which are scheduled for May 4th. Though it was rumored that he would drive a Benz, negotiations which were pending have fallen through, according to Jesse Froehlich, who states that though he wired Oldfield several times, no reply was received.

Technicality that May Curtail Reciprocity.

Despite the enactment of the reciprocity law by the New Jersey legislature, and the general belief that all bars had been let down, somebody in authority has found a way of continuing the irritation and bad feeling which has existed for so many years between New Jersey and its neighbors. While it is not disputed that it is no longer required that non-resident's cars be registered in New Jersey, and that their owners may drive them at their own sweet will, whoever it is that is bent on making trouble is seeking to set up the bar against professional chauffeurs. New York provides chauffeurs with a badge, which must be worn conspicuously, while New Jersey requires no badge whatever, and that technicality has been seized upon as being sufficient to require that New York chauceurs obtain Jersey licenses, and vice versa.

Although it is stated that New York's secretary of state is responsible for the ruling, at his branch office in New York Cty, where registration certificates and chauffeurs' licenses are issued, nothing whatsoever is known of such an order. Most of the indications point to the fact that J B. R. Smith, New Jersey's commissioner of motor vehicles, is the man who discovered the technicality and is seeking to make the most of it. His term has expired and he is merely holding over pending the appointment of his successor. The discovery of such a technicality as the one that has brought to bear is not inconsistent with his official attitude. He is a great handshaker, and knows how to put his arm on the other fellow's shoulder while professing cordiality, but not all of his actions have borne out this attitude.

Elgin's Association Elects Officers.

At the annual meeting of the Elgin National Road Race Association the following officers were elected: President, Harry D. Hemmens; vice-president, Theodore J. Schmitz; secretary, Wallace C. Wilson; treasurer, Philip Freiler; general manager, Fred W. Jenks.

The meeting took under consideration a proposed contract with the Chicago Motor Club to stage five events, including a free-for-all race, on the Elgin course on August 23rd and 24th, but it was decided that if upon investigation it should be determined that the free-for-all would in any way detract from the Elgin National Trophy race the event would be eliminated.

Ritchie Retires as N. Y. S. A. A. Secretary.

J. Arthur Ritchie, of Albany, secretary of the New York State Automobile Association, and one of its most earnest workers, has resigned that office. His successor has not yet been chosen.

HELD LIABLE FOR "CHECKED" CAR

New York Court Orders Innkeeper to Pay Damages to Motorist for Lost Car—Legal Points Involved.

Declaring that it is the duty of an innkeeper, who makes a business of "checking" the cars of his guests during the time of their stay in the inn or restaurant, to keep careful guard over them and to make good any damage or loss experienced while they are under his care, a jury in the Second District Municipal Court, of Brooklyn, N. Y., awarded $500 damages to Dr. A. S. Brinkerhoff, of Brooklyn. The sum represents the amount sued for the loss of the doctor's car while supposedly "checked" at Feltman's Brothers' cafe, on Coney Island.

According to the testimony submitted, Clifford Brinkerhoff, a son of the doctor, and three of his friends drove in the doctor's car to Feltman's. They put the machine into the parking space reserved by the management for the use of motorists and got from the uniformed attendant in charge a numbered check bearing the name of the Feltman establishment. An hour later, when they came to get the machine, it was gone. The car was found next day in a ditch in the Kingsbridge section of New York. The lamps, spare tires, speedometer, magneto and other movable attachments were missing. Other damage had been done, which brought the price of repairs and replacements to more than $700.

In order to avoid delays which would follow a suit in the Supreme Court, Dr. Brinkerhoff decided to bring it in the municipal court. He asked for the largest sum allowed in the lower civil court. Feltman Bros. refused to accept responsibility for the damage suffered, although they offered later to settle for $100, when they saw the doctor determined to sue.

It was contended by Dr. Brinkerhoff that the issuing of the numbered ticket, which was received from the uniformed attendant, made the Feltmans responsible for the car while it was in the parking space. Furthermore, the car was surrendered to whoever took it without any ticket being shown.

The Feltmans, in the trial of the suit, denied that the checking was under their control, and said that a man named George Davidson had it independent of them. It was testified, however, by others that the attendant wore a uniform marked with the name of Feltman's, and the ticket was so marked. The contention was raised by the defense that inasmuch as the parking space was maintained only as a convenience and no fee was charged, the restaurant folks could not be expected to be responsible for service rendered without compensation.

The jury was out only ten minutes, there seemingly being no doubt in its mind as to the responsibility of a man who "checks" cars—with or without direct pay.

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DURYEA IMPROVES HIS "ELECTA"

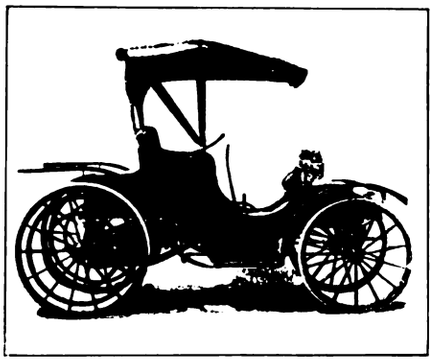
Veteran Manufacturer Further Simplifies His Already Simple Vehicle—Wherein He Found it Possible.

Having moved bag and baggage from Reading, Pa., to Saginaw, Mich., and having become settled in new quarters, Charles E. Duryea once more has started in earnest to produce Buggyauts, runabouts, motor accessories and novelties, this time under the firm name of the C. E. Duryea Co., successor to Chas. E. Duryea of the Pennsylvania city, and his latest product, which is styled the "Electa," though much like its immediate predecessor, is of even simpler construction. It already was very nearly the simplest vehicle of its kind extant, but despite that fact room for improvement has been found in several minor details, and by reason of several additions and alterations, its attractiveness has been considerably increased.

By way of permitting the greatest possible flexibility and the fullest benefit from the springs being obtained without danger of body distortion being transmitted to the mechanism of the vehicle, a triangular chassis frame has been adopted in place of the rectangular frame which heretofore has been used. The frame is attached to the front of the body by means of a ball and socket joint, and in addition to permitting a virtual three-point suspension of the body, allows lower suspension and thus increases the stability of the vehicle. As the front of the frame is carried by the body, which is supported by the springs, the motor and transmission gear is relieved from much of the shock incident to the passage of the vehicle over rough roads. Incidentally, the new arrangement furthers accessibility by permitting the body to be removed quite easily and quickly by the loosening of a few bolts.

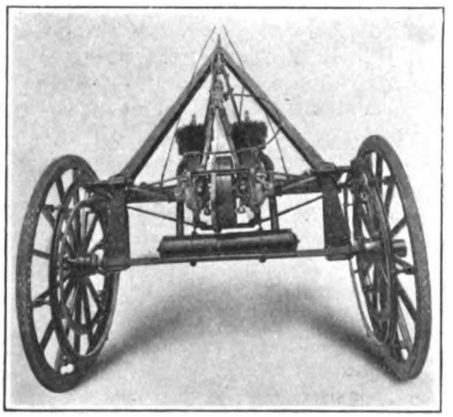
The engine remains the same as it always has been, i. e., two air-cooled cylinders with the flywheel located between them, and the crankshaft serving also as the drive axle. The arrangement, which has always been a distinctive feature of Duryea cars and probably always will be, is shown quite clearly in the accompanying picture of the chassis. One of the new features is the incorporation of what is styled an easy starting device. In consists of a miniature pump by means of which the cylinders may be primed with gasolene, which, it is explained by the inventor, "makes an explosive mixture and also cuts the heavy cylinder oil, and makes the engine turn as freely on a cold day as when warm." Another slight change which has been made embraces the use of lighter inlet valves.

The transmission elements remain unchanged, the roller drive, which provides two speeds forward and reverse, being retained intact except that the method of attaching the rings to the wheels has been improved by the substitution of forged instead of partly cast fastenings. As heretofore, control and brake levers are placed in the center of the footboard, so that the vehicle may be operated from either side. In order to facilitate control, steering is



DURYEA'S LATEST—THE "ELECTA"

effected by means of a lever, which is hinged at the top, so that it may be swung over to either side. Practically the only other alteration which has been deemed advisable concerns the muffler, which has been enlarged in size and provided with



DURYEA'S "ELECTA" CHASSIS

a greater number of expansion chambers the better to silence the exhaust.

Hyatt Publishes a "Plant Book."

An unusually handsome piece of press work is the "plant book" published by the Hyatt Roller Bearing Co., of Newark, N. J., and Detroit, Mich.—so called because it is devoted to descriptions and illustrations of the plant at Newark, where the Hyatt roller bearings are made. The book—it really is more than a pamphlet—is of large size with an embossed, gold-lettered cover, and contains 52 pages. Beginning with a view of the complete plant, the various departments are illustrated by fine engravings, each occupying half of one of the large pages, with the descriptive matter printed below. The handsome offices and reception room, engineering offices, analytical and physical laboratories, testing department, power plant, stock room, the numerous machining departments and finishing rooms, tempering furnaces—all these and more are illustrated and described in a way that is highly creditable to the compilers. The "plant book" not only is interesting to read and look at, but it is well worth keeping. The Newark plant is the only factory of the Hyatt company, the Detroit offices being devoted to sales work and the arrangement of engineering matters in connection with the use of Hyatt bearings in motor cars.

"Peroxide Discovery" Is Exploded.

The British chemist who discovered that the addition of two ounces of "20-volume" peroxide of hydrogen to each pint of water used in an acetylene generator would increase the illuminating powers of the gas generated by about 50 per cent., has been "undone" and his theory being that the oxygen liberated from the peroxide materially aided combustion and hence the greater luminousity of the gas has been flouted. That there is absolutely no benefit derived from the practice has been demonstrated in a series of photometric tests conducted by Professor Vivian B. Lewes, chief superintending gas examiner of the City of London. Professor Lewes' tests were conducted in a very systematic manner, under varying conditions as to the types of generators used and the design of the burners and the pressure of the gas. Apart from the fact that the practice does not add light, Professor Norton declares that it is positively dangerous, as the mixture of oxygen and acetylene is very explosive.

Miller's Catalog a Near-Encyclopedia.

Attractive covers always have been features of the catalogs issued by Charles E. Miller, of 97-103 Reade street, New York, and the 1912 catalog, which just has been issued, is no exception to the rule. With a motor car in the foreground, flanked by a motorcycle and a motor boat and a couple of aeroplanes in the background, done in colors, the contents are vividly suggested. As usual, the Miller catalog is practically an encyclopedia of motor supplies; its 256 pages list an enormous variety of the things that pertain to motoring on land and water and in the air, from complete motors down to the smallest parts. Big as the catalog is, there is no difficulty in finding any particular article, a good index, which also is a Miller feature, making this easy.

Battery Gas That is Inflammable.

It not infrequently is denied that the fumes from a storage battery on charge are inflammable, but such is the case, and it is by no means safe to bring a naked flame near a cell that is "gasing" freely. Battery repair shops and charging stations usually are careful in this respect, knowing by practical experience that the gas can be ignited.

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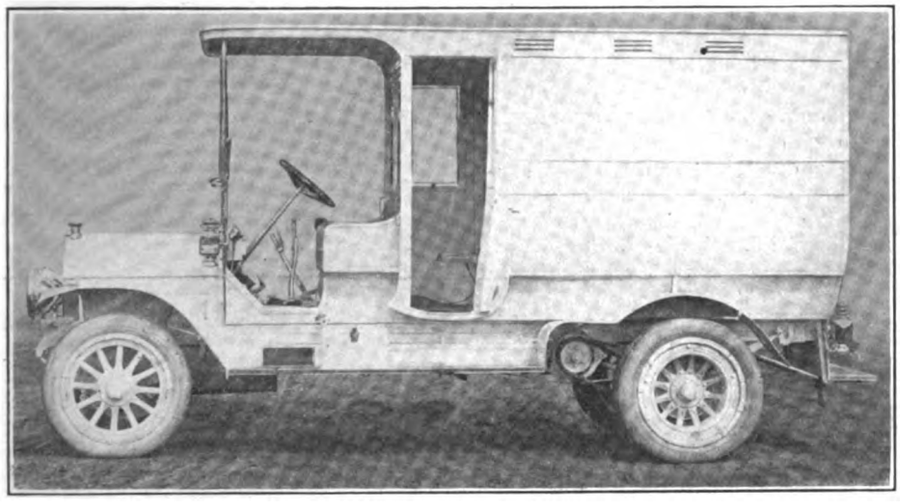
THE AMBULANCE MADE LUXURIOUS

Knox Brings Art and Ingenuity to Bear With Impressive Effect—Features of Most Modern Vehicle.

What appears to be the last word in ambulance construction comes from the Knox Automobile Co., of Springfield, Mass., whose long experience as builder of automobiles has been brought to bear on the problem of ambulance design, the result being the handsome car shown in the accompanying illustration.

The feature of the machine, which is built on a Knox 40-horsepower chassis with a wheel base of 134 inches, is the body. Strength, lightness and freedom from creaking when in motion being highly desirable, the framing was built up of rigidly braced ash, sheathed with one-piece sheet aluminum panels outside and with three-ply whitewood veneer within, the latter forming an unbroken and sanitary surface. The ash-wood floor is covered with linoleum. The body is divided into three compartments; the forward one for the driver, the second for the doctor's use, and the third, which of course is the largest, for patients. The doctor's compartment has a door on either side and is equipped with a seat, which is folded when not in use. This compartment opens directly into the rear of the body, there being no door between. This entrance is on one side, and back of the partition on the opposite side are two cots, one above the other, arranged so that they can be placed at any angle and also can be folded. Each cot slides smoothly into a metal frame, and under the lower one is a large locker for supplies. At each end of the cots, but on the opposite side of the car, are folding seats, and on the wall between them is a complete hot and cold water supply apparatus, with folding sink and a drain pipe which leads to the outside of the car. By lighting an alcohol lamp when the ambulance starts, water is heated while the car is on its way. A large vacuum bottle with rubber tube and faucet, and a rack of drinking cups are provided also, and there is a metal tray with antiseptic pad under the bottle.

Provision is made for an ample supply of fresh air by the use of three large ventilating shutters on each side under the roof, and there are windows in the doors and one in the wall opposite the cots, all of which can be opened. These afford ample light, and the white enamel finish of the interior is bright and sanitary. The double doors at the rear of the car open the full width of the body. At night illumination is furnished by an electric lighting installation, which includes a dynamo driven from the engine and a storage battery, kept charged by the dynamo, which furnishes current when the engine is idle.



NEW KNOX AMBULANCE WHICH AFFORDS UNUSUAL ACCOMMODATIONS

The tire equipment, which has much to do with the smooth running of the ambulance, consists of twin pneumatics in the rear and singles in front, all 38x5½ inches, and the springs, which are semi-elliptics, are long and easy. The exterior finish of the car is white with fine gold striping.

Improvement in Tungsten Filaments.

So severe are the conditions under which motor car electric lights are used that in order to have long life a lamp must possess exceptional qualities of resistance to vibration. Tungsten filament lamps have shown themselves well adapted to motor car work when properly made, and the "Mazda" lamps, which are now especially made for motor car work by the Federal Miniature Lamp Works, of the General Electric Co., of Cleveland, O., using a drawn wire filabent, are said to be unusually long lived and at the same time economical in the use of current. Tungsten filaments as originally constructed were decidedly weak and easily shaken to pieces, though highly efficient, but the drawn wire filaments now employed are much stronger and quite as economical.

SIMPLIFYING CHARGING OPERATIONS

Great Part the Mercury Arc Rectifier Has Played in Serving That End—Some Little-Understood Features.

When Peter Cooper Hewitt invented his mercury arc rectifier, safe to say he scarcely imagined the ultimate place it would make for itself in the world and the extent to which it would be used. Because it has been found cheaper and more economical to generate alterating current for transmission over long distances, and because direct current is used so extensively in operations for which alternating current cannot be used, the mercury arc rectifier slowly but surely is ousting other and more expensive methods of conversion. Just how important a place the mercury arc rectifier is destined eventually to occupy in commerce is revealed by the fact that recently perfected apparatus of this type is in use for the conversions of currents so heavy that heretofore it has been possible to handle them only through the medium of tremendously heavy and expensive rotary converters.

It is because of the inherent simplicity of the apparatus and its extraordinary efficiency that it has come into such general favor, one of its fields of usefulness being in the chargng of storage batteries. But even though the mercury arc rectifier is so extensively used and despite its extreme simplicity, there are few to whom its secrets, such as they are, are plain. The rectifier consists of a glass bulb from which the air has been exhausted and which contains an amount of mercury; the bulb, therefore, contains nothing but mercury and mercury vapor. Into the bulb the two terminals of a source of alternating current are inserted.

It has been found that at the negative electrode in the bulb there is a high reluctance to the passage of current, but there is practically no such reluctance at the positive electrode. Once the reluctance is broken down at the negative terminal, however, the passage of the current takes place with very little loss. Current cannot flow in the opposite direction, alternating current being current which flows alternately in one direction and then in the other, because the positive electrode then would become the negative electrode and would offer a high reluctance to the passage of the current.

One form of the rectifier is to use three positive electrodes, one for each phase of a three-phase circuit, and one negative electrode. As the three phases overlap, the negative electrode must always be negative to one or the other of the positive electrodes, so that once the rectifier is started it will continue to run, using the impulse only in one direction. By this means a direct current may be taken off the negative electrode, which will be slightly pulsating,

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though not so much so as the pulsating current produced by the commutator of a direct current generator.

There are other ways of operating the rectifier, so that it may be used with a single-phase alternating current. An auxiliary current may be used to keep the path through the negative electrode open, or the reluctance at one electrode may be made far stronger than the reluctance of the other. The reluctance at the negative electrode varies inversely according to the density of the vapor, which in turn is controlled by the heat generated in the rectifier. In experiments which were made with the mercury arc rectifier by the Westinghouse Company, in Pittsburgh, it was determined that when 500 volts alternating current are passed through the rectifier, direct current of between 484 and 486 volts is available at the negative electrode, indicating an efficiency of nearly 97 per cent. With smaller voltages the efficiency is slightly lower.

Good Roads Conspicuous in Canal Zone.

Although the impression prevails that except within the cities of Panama and Colon, good roads in the Canal Zone are conspicuous by their absence, P. C. Avery, of Milwaukee, who recently returned from a visit to the "big ditch," states that the impression is far from actual fact.

"The United States government has built and improved more roads on the Isthmus than it has built in the United States for a considerable period," writes Avery. "There is a fine macadamized road which would extend clear across the Isthmus if it were not for a break of 18 miles in the black swamp district of the Canal Zone. There also is a fine macadamized road leading from Panama to the old city of Panama, and the streets and roads in and about that city and Colon cannot be surpassed by those in many cities in this part of the country. The roads, too, are all posted with signs cautioning motorists to respect the 12 miles an hour law, and all vehicles, including those drawn by horses, carry lights, horns and bells."

"Tail" Lights for British Infantry.

Hereafter the British army will carry a "tail" light, so to speak. At least that is the effect of an interesting divisional order which just has been issued at Aldershot, and which requires that when the soldiers are en marche at night one of the men in the rear file carry what is styled a "reflex" light attached to the back of his belt. The device is not a light at all, though it serves all the purposes of one. It is simply a reflector, which is designed to reflect the light from the powerful head lamps of overtaking cars and thus warn drivers of the obstruction in the road. It is claimed that the khaki colored uniforms blend too well the scenery at night, and the order is the direct outcome of a previous unfortunate accident, in which a heavy touring car crashed into the rear of a column.

CANADA FOR ELECTRIC VEHICLES

Conditions That Make for Their More Extensive Use in the Dominion—Why Electric Current Is So Cheap.

"I have often wondered why there are not more electric vehicles in Canada than are in use there," recently remarked an eminent civil and mechanical engineer who has spent a good part of his life in the Dominion in the service of the government and in private enterprises of an engineering nature. "I have tried to conceive of an idea why the electric — quiet, smooth-running and efficient as it is—has failed to 'catch on,' and I must confess I am at a loss for an answer.

"It seems to me there ought to be at least as many in use in the larger cities, per capita, so to speak, as there is in the larger cities of the United States, and there are several good reasons why this should be so. First and foremost, the cost of electricity for power in Canada is but a fraction of the cost in the United States. A few years ago the cost of current was considerably higher than it is at present, though it never was prohibitive. Now, however, due to the operation of the Hydro Electric Power Commission, which was apointed in June, 1907, the cost of current has been reduced in some cases to less than half the old rates.

"By way of example, for instance, let us take the City of London. Under the old regime current cost the consumer at the rate of from 4 to 8 cents per Kilo-Watt-Hour of consumption, according to the amount of power required. At present the rate varies from 1¼ cents to 3½ cents. This is for the City of London alone, and it must be understood that the rates for other cities have been reduced proportionately to the amount of current consumed; the greater the current consumption, the greater the reduction.

"It is possible that electric vehicles would not acquire great vogue in the City of Quebec because of the exceptionally steep grades and the consequent great consumption of current; but in other cities, however, and particularly those which lie on Lake Ontario, such as Toronto and Hamilton, both of which are fairly large, there are no grades worth speaking of. Both of these cities receive part of their current on contract from the Hydro Electric Power Commission. Toronto gets the greatest part of its power from this source, though Hamilton relies for the most of it upon its own resources, which include waterpower, which permits the generation of current at even lower cost that it can be purchased from the Commission for.

"Practically every city of any size throughout the Dominon has well paved streets. In the majority of cases the pavement is a great deal better than can be found in any city in the whole of the United States. Similarly the roads are uniformally good outside the cities, at least in Ontario. But this is a matter which requires consideration in a small way, for the electric pleasure vehicle scarcely is expected to be capable of extended touring service, and the electric commercial vehicle finds its most useful field in short haul, frequent stop city work.

"It cannot be said that there is no money in the Dominion for the purchase of electricts, for the popularity of the gasolene car, which steadily is increasing, sets at naught this consideration. Commercial vehicles of the gasolene type, too, gradually are coming to be used in greater numbers. It may be that the Canadians have not yet been educated up to the advantages of the electric. In fact, it seems that that is the only reason why they are not more extensively used. Perhaps some day, when they have come to the realization of the real cheapness of electric power and of the genuine worth and surely increasing value of the electric vehicle as a means of transportation, it may become more popular, for there is no reason in the world why it should not. In the mean time, it seems that there is room a-plenty for an aggressive advertising campaign which shall undertake in a broad way to educate Johnny Canuck up to the advantages which exist in his own home."

Effect of Giving Constables Free Rides.

On January 1, 1912, when the Bavarian government decreed that no more would its motor buses employed in interurban mail delivery and passenger service be permitted to carry country constables along the highways of their districts free of charge, it was expected that this order would result in a considerable saving to the mail service department. To the surprise of the postal authorities, however, the expenses were larger than before, due chiefly to a mysterious increase of minor accidents and collisions on the highways at night. Investigation brought out that as soon as the word was passed that "gendarmes"—as the rural constables are called in Germany and France—were not transported on the mail wagons free of charge, as formerly, the teamsters decided to "forget" the law requiring the lighting of their vehicles after nightfall.

The presence of constables riding on the hundreds of mail wagons frequenting the country highways had acted as a continuous reminder of the fact that the eye of the law was watching traffic in general and the teamsters in particular. As a result, they drove carefully, refrained from falling asleep on their carts and kept their lamps properly lighted. The removal of the "free ride" privilege took that restraint from them, and accidents increased so rapidly that the government last month was forced to restore the constables' privilege of gratuitous transportation. The order went into effect immediately.

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GRAMM ON GUARANTEES FOR TRUCKS

Discusses Subject in Outspoken Fashion and Points Out Purchasers' Duties—Song That Aptly Applies.

"Today the buyer of a motor truck has every advantage in the way of guarantees," says B. A. Gramm, vice-president and general manager of the Gramm Motor Truck Co., of Lima, Ohio, in discussing that very vital subject. "The present extremely high costs of motor truck manufacture are brought about largely by the unreasonable demands made by owners and operators. This, of course, is not applicable to all users, for there have always been some reasonable operators, and many are beginning to realize the advantages to be derived from dealing with the truck manufacturer who is producing a first-class truck and who, by good business methods, is making a fair return on his investment and will, therefore, stay in business. They can see how a short-time guarantee by this maker is better than a guarantee of two, five, or seven years by less conservative, conscientious and businesslike makers.

"No first-class manufacturer of motor trucks will refuse to replace a defective part, if that part be sent to him for inspection, irrespective of any guarantee he may have placed on it.

"The recent convention of commercial vehicle manufacturers held in New York, after careful consideration of the situation, recommended a ninety-day guarantee. But this does not mean that no maker will replace any defective part which may show up six months after delivery, but was adapted for the protection of the manufacturer against unscrupulous users. The time will come when guarantees will be eliminated as unnecessary. Until then, the manufacturer should insist upon the user paying, at least, for his education, instead of the manufacturer himself standing the brunt of it and paying for it.

"Experience has shown that one of the great troubles has been to convince the buyer of the type of truck he should purchase. If a study of his business conclusively showed to the manufacturer that the buyer should install two-ton trucks and the buyer absolutely insisted that one-ton trucks were of ample size, the manufacturer, rather than lose the business, has sold them, with disastrous results. The blame for all failures invariably was placed upon the manufacturer. The user claimed that the trucks were too light and would not stand the work, when the truth is they were overloaded. Had he installed the heavier model, the user would have had satisfaction from the start.

"The manufacturer lays down certain rules of proper care, and specifies carrying capacities and maximum speed limits, which if exceeded will result in withdrawal of the guarantee. No attention is paid to these requirements, but if the manufacturer does not help the user out of trouble he has gotten himself into, he threatens to trade his trucks for some other make. To the serious detriment of the truck industry at the present time, too many manufacturers are abetting this sort of thing.

"Some of the highest costs of truck manufacture are brought about because the truck maker has to provide not only the finished truck, but must bear all the burden of expense in teaching the operators, often providing even the drivers. He must either become an expert on transportation, or hire one and furnish his services free of cost to his customer, who wants an insurance against any possible loss and asks for all sorts of guarantees which are absurd on their face and which he does not get in any other line of business.

"Now, why should not the purchaser, who is to be the great gainer, be willing to pay at least for his education? There is nothing that can be done by horses in merchandise delivery that cannot be done faster and more economically by motor trucks, but as the trucks should be handled and treated in a different way from horses, the motor truck manufacturer certainly should be protected if the purchaser insists on handling the truck his own way. Every truck maker who is giving long-time guarantees, is, I am convinced, showing a weakness in his product, because his policy proves that he is selling his machines on promises and not on their quality.

"Speed governors should be installed on all trucks. It is important that they should be accurate and really govern, holding the number of revolutions of the motor down to a certain given point. However, the governor will not control a truck coasting down long grades, and it can often be tampered with by experts without the knowledge of the manufacturer. To overcome this, every truck should be equipped with a speedometer that has a maximum hand or a recorder which should be sealed or locked and the key kept by the owner. This will show the highest speed attained at any time with the truck. If a fine were to be charged against the driver for exceeding a certain speed limit, and dismissal were to follow the second fine, 90 per cent. of the present truck troubles would disappear. The song that was written several years ago, entitled, "It is not the miles we travel but the pace that kills," should be applied to motor trucks and sung all over the land.

"Last of all, tire manufacturers should take an absolute stand against overloading and report every case that comes to their attention to the owner of the truck and to the manufacturer. Above all, they should insist on the use of tires of sufficient size for the load capacity, which they can back up with their guarantees, but they should be perfectly impartial to all truck manufacturers and not give one an advantage over others, which, at the present time, they are doing in many cases."

BENZ DISPUTES DAIMLER'S GLORY

Celebration in His Honor Evokes Pointed Protest—Historical Dates That Have Been Called Into Question.

March 4th last was celebrated by the German town of Untertuerkheim as the twenty-lfth anniversary of the appearance of the gasolene automobile. The Daimler works closed for the day and festivities of a more or less joyous nature marked the occasion, which, however, served to bring public protest from the Benz company, which maintains that Untertuerkheim was not the proper place for such a celebration, and that the twenty-fifth anniversary in question occurred in 1910, almost two years before.

According to the Daimler side of the controversy which has arisen over the historical date, it was on March 4, 1887, that Gottlieb Daimler for the first time traveled over the streets of Esslingen and Cannstatt with his "benzin motor carriage," although two years before he had succeeded in propelling a tricycle by means of gasolene; but the tricycle, not being a four-wheeler, it does not, according to the German viewpoint, rank as a true forerunner of the present automobile.

The Benz protest flouts all of the Daimler claims. The Benz people state that it is a matter of record that the first automobile left the Benz factory in Mannheim in December, 1885, which original car at present reposes in the historical museum at Munich, Germany, flanked by copies of two patents issued on its construction in January, 1886, and April, 1887. The second patent covers a selective, two-speed transmission. The Benz interests also point out that at the great industrial exhibition held in Munich in 1888, a Benz automobile was displayed, thereby taking rank as the first one to be publicly exhibited.

Italy's Exports and Imports Both Increase.

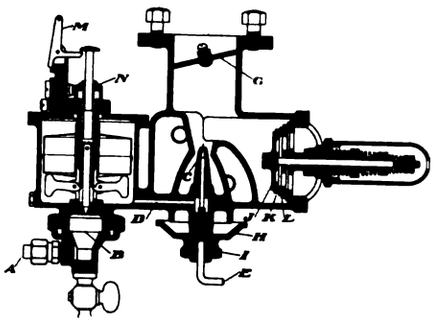
Statistics of Italy's exports of automobiles, which have just been made public, show that during the year 1911 the business attained greater proportions than generally was reckoned to be the case, the shipments of pleasure and commercial cars reaching a total value of $6,291,659, as compared with $5,635,000 in 1910. The pleasure cars numbered 2,918 and were valued at $5,825,775, while $465,884 worth of commercial cars were sent abroad. The heaviest buyers of Italian cars are: Great Britain, which purchased 935 complete cars and chassis; Argentine, 346 cars and chassis; France, 242 cars and chassis; United States, 154 cars and chassis. Italy at the same time increased its imports of foreign-built cars considerably, the figures for the year 1911 being 737 cars, valued at $1,300,000, as compared with 400 cars, worth $900,000, in the preceding year.

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New Carburetter with Novel Air Valve.

In seeking to eliminate some of the faults of the ordinary carburetter and to provide a device which will deliver a mixture of constant proportions regardless of the quantity supplied, the Dusquesne Auto Accessories Co., New Kensington, Pa., which manufacturers the D.W.K. carburetter, has not relied on any one particular means. Instead, the method which is used to attain this very desirable end embraces a combination of features, the principle and most novel one of which is the employment of a unique auxiliary air valve, which is in reality three valves concentrically arranged.

The other features upon which reliance is placed embrace the arrangement of the component parts, which permits of a straight through passage for the gases under all ordinary running conditions, and a hot water jacket which completely encloses the whole carburetter. Referring to the accompanying sectional view, the gasolene enters via the tube A, whence it flows into the float chamber through a screen (B).

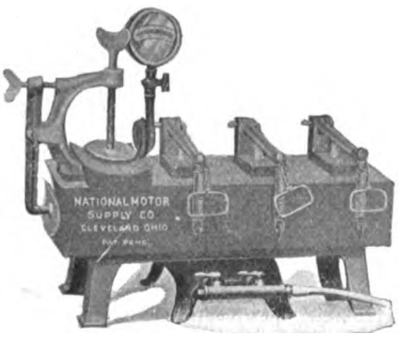


D. W. K. CARBURETTER IN SECTION

By means of a small adjustment nut, the height of the gasolene in the float chamber may be varied to suit requirements. From the float chamber the fuel passes to the needle valve (C) through the passage D, the size of the orifice at the needle valve being adjustable by means of the thread on the valve itself. Under normal running conditions, when auxiliary air is not required, air is drawn in around the spray nozzle through a passage, the size of which is governed by the air cup H, which may be adjusted and locked in place by means of a lock nut (J). As the speed of the motor increases and more air is required, it is drawn through the auxiliary air valves J, K and L, which are held to their seats by springs of different strengths. As the tension of these springs may be adjusted separately, it is possible to obtain closer regulation than is usual, which is one of the reasons for the claim of greater flexibility and greater fuel economy. To assist starting in cold weather, the float is provided with a "tickler," which permits a quantity of gasolene to collect in the small cup-shaped reservoir surrounding the needle valve. As the air enters by way of the air cup it passes over this pool of gasolene, providing a rich mixture.

Vulcanizer Designed for Garage Use.

While vulcanizing often is considered a difficult and complex business, to be undertaken only by experts even when the work to be done is not large, the National Motor Supply Co., of Cleveland, Ohio, which makes a specialty among other things of vulcanizers, seeks to dispel this impression by bringing out special types of vulcanizers suitable for the use of those who, though not experienced in such work, may have occasion to repair inner tubes and castings. The latest product of this concern is a special garage vulcanizer which is capable of doing a variety of small work, such as



"NATIONAL" GARAGE VULCANIZER

vulcanizing three inner tubes simultaneously, or two sections, each 4 x 8 inches, of a casing. The tube plate measures 7 x 16 inches and the casing molds are curved both ways and will take casings of any size. Putting full sections in casings and doing re-treading is beyond the capacity of the apparatus, but it will handle all kinds of tube work and almost any other variety of casing repairs.

The National garage vulcanizer, which is of the steam type, is fitted with a steam pressure gauge, safety valve and a water plug, by means of which water can be put in the reservoir at any time. It can be heated by means of manufactured gas, natural gas or gasolene, special burners being furnished for each fuel. And, last but not least, the vulcanizer is sold at a very reasonable price.

Sapphire Tools for Hard Steels.

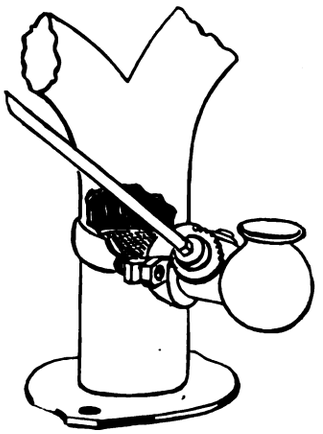
It is usual to consider that steel, when made as hard as possible—glass hard—is incapable of being machined in a lathe. While it is quite true that hardened steel cannot be machined with steel tools, it can be cut, and cut easily, with sapphire-edged tools, which take the metal off in curling shavings and leave a beautifully smooth surface. Such tools are ground on "laps" charged with water and diamond dust, and when properly formed and handled they are remarkably durable. On small work thousands of cuts can be taken before a regrinding is necessary. No special skill is required for the sharpening process.

Never attempt to harden a large tool in a small bath and hope for good results. Uneven hardness is sure to result.

Auxiliary Air Valve of Simple Constructon.

It is not without reason that the carburetter is one of the most abused parts of the equipment of an automobile, for the carburetter is responsible for a great deal of trouble—that is, some carburetters are, while others are comparatively blameless. With a view to the improvement of conditions where the carburetter is not all that could be desired, a device has been evolved by E. S. Michener, of New Castle, Pa., which is designed to permit the regulation of the mixture of gasolene vapor and air from the seat, without in any way altering the adjustments of the carburetter.

The device consists of a special air valve which is controlled by means of a rod and handle, the rod reaching from the dash to the valve, and the valve being attached to the intake pipe just above the carburetter. As the illustration shows, the valve has a bowl on the intake end, and gasolene can be poured into this for priming purposes, the air carrying it directly into the intake



MICHENER'S GASOLENE SAVER

manifold. A hole is drilled in the manifold and the valve clamped over the hole by means of a brass strip and nuts which form part of the outfit.

In use, the carburetter is adjusted so as to give a mixture that is sufficiently rich for easy starting and ordinary running, and the air is adjusted from the dash by means of the valve handle as the car runs, so that it is possible to obtain the best mixture under given conditions. By this method the mixture can be confined to such proportions of gasolene and air that it will burn clean, avoiding the fouling of the engine and saving gasolene, as well as getting the maximum power from the motor. When descending grades the valve is opened wide, and the throttle closed. This permits only pure air to be drawn into the engine cylinders when using the motor as a brake; it is not necessary to switch off the ignition because there is nothing to ignite, though, of course, there is nothing gained by keeping the ignition apparatus working. The Michener gasolene saver is made of solid brass, in sizes to fit any intake manifold, and is so simple as to be easily attached.

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QUIETING THE ACTION OF POPPET-VALVE MECHANISMS

How Some Prominent Manufacturers Attack the Problem of Minimizing Valve Noises by Preventive Rather Than by Curative Means—The Important Part the Cam Plays and the Reason it May Conduce to Silence or to Noise According to its Profile.

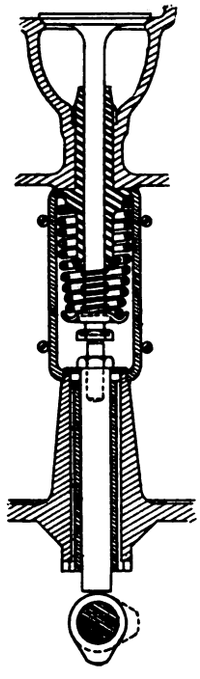
The poppet-valve motor is just as much a fixture to-day as ever it was, and no matter how careful may be the scrutiny of present conditions and tendencies, nor how elaborately facts and figures may be fashioned into its winding sheet, for use in the immediate future—its natural end is far removed, though the vision is obscured to some by the smoke the rapid progress of the "poppet-valveless" engine has made.

Despite the rapid rise of the various types of slide and sleeve and crescent and rotary and piston valve engines, and the number of such engines that are in use, the poppet-valve engine retains its accustomed niche; there has been no falling off in sales, and there are more in use now than there ever were. It is a staple that never may be wholly replaced. But there is at least one thing that the poppet-valveless engine has brought into bolder relief: It has held up to the light that existing types of poppet-valve engines are susceptible of no little improvement; it is quite natural for several perfectly obvious reasons that attention should be focused on the valve mechanism as a field fertile with latent possibilities.

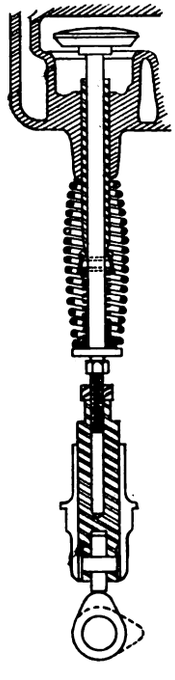
"Let well enough alone," it is to be feared, too often was the slogan of the manufacturers of a few years ago. And, sad to relate, it still is true in some few cases, though such manufacturers gradually are being reached by stray beams of light reflected from the glory achieved by the progressives. As for the latter, they have been quick to appreciate that "silence is golden," and that poppet-valve mechanism can be made a great deal more perfect than generally was supposed—as witness the latest products.

Even to the most obtuse individual it must be apparent that the search for silence is being prosecuted with greater vigor than ever before. Just how much the increasing popularity of so-called "valveless" motors has to do with the stimulus given the movement is not quite plain. It suffices, however, that motors of the poppet valve type are now far quieter than they were even so short a time as one year ago, and that there scarcely is a single manufacturer who has not within a comparatively short time adopted, or even now is preparing to adopt, some particular means of silencing valve noises.

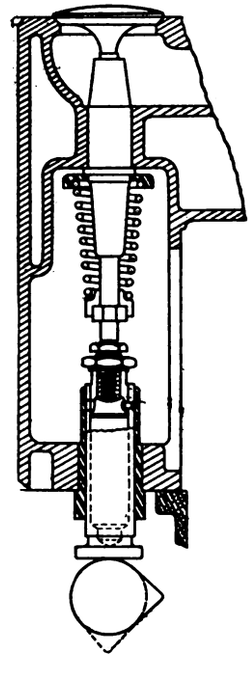
No engine is absolutely quiet at all speeds. With the individual who is credited with having said that there are no bad whiskies, that some whiskies are better than others, it might be said that some engines are quieter than others. Vibration and noise are so inseparably linked that it is impossible to have the former without the latter, and, at present at least, it is impossible to eliminate vibration entirely. Of course, an engine must be treated as a unit, of which the valves are as much a part as are the pistons, but whereas it is possible easily to make pistons and any of the other parts of an engine so quiet as to be inaudible, the silencing of valves is, as Kipling says, quite another story; it has a moral that is plainly apparent.



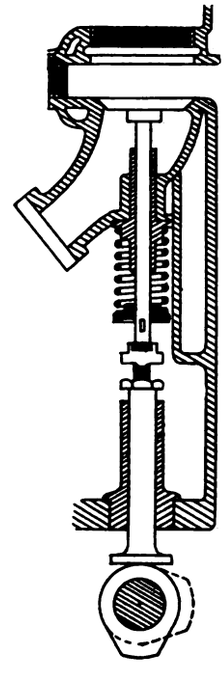
OVERLAND



CADILLAC



CONTINENTAL



MODEL

In discussing valves and valve mechanism in general, or rather poppet valve mechanism, it is a simple matter to prove that one system is better than another if evidence touching on the quality of material and workmanship is admitted. And while such evidence must of necessity be considered, it must also be kept in the background, for though it marks the connecting link between theory and practice, and therefore is of importance, data are difficult to obtain. For a true consideration of all the systems in use, or of many of them, it must be assumed that all are of equal perfection of workmanship and material.

As applied to an automobile, the old saw "Silence is Golden" is double acting, or rather it should be so. The car that is silent, that appears to glide along without

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visible effort and minus audible indications that it really is running, is the car that appeals to the majority of motorists. Of course, there are those of the sporting (?) fraternity who like to be heard a mile; they consider it good advertising. But the majority prefer quiet, and consequently the quiet car should and does prove the best seller.

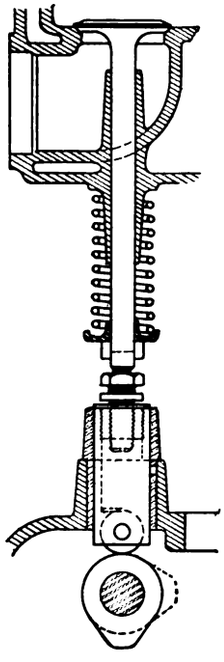
In the other light, silence should be golden, for according to engineering tenets it should indicate perfection of workmanship —the perfection that permits a tremendous electric generator, for instance, to run day and night and never emit a sound beyond a slight hum caused by the rush of air. The phrase "silence should indicate perfection of workmanship" is used advisedly. Generally it does, but quite often it does not. Which makes plain that there are two ways of obtaining silence. One of them is to obtain it by and with perfection of workmanship and design, and the other is to obtain it as a secondary consideration. Theoretically, there should be no necessity for the secondary consideration. Every part should be so perfectly designed and made that silence would follow in natural order. However, it is not always possible to follow theory as closely as is desirable, though it does not alter the fact that to prevent the possibility of noise by expert designing and workmanship is far and away better than to muffle the noise while permitting it.

Quietness of valve action does not depend alone on the actual design of the valve parts and their method of actuation, though these factors naturally play their part. For instance, a timing gear that had proved troublesome because of the noise it emitted was effectually silenced by being drilled near the periphery and the holes plugged with lead. Though the gears fitted perfectly and were well lubricated, there was a certain amount of ring to the metal which was prevented by the lead plugs. In the same way, ample water jacketing around the valve stems and guides will assist materially in reducing noise. Such little noise as there may be, and it is impossible to design poppet-valve mechanism so that it will be absolutely silent, may be accentuated by the shape of the casting and the ports. Cases have been known where, despite excellent design and workmanship, valve gear was more than ordinarily noisy simply because the cylinder casting acted somewhat like a sounding-board. Redesigning the cylinder casting so as to permit more liberal water jacketing around the valve stems and guides eliminated the noise almost entirely.

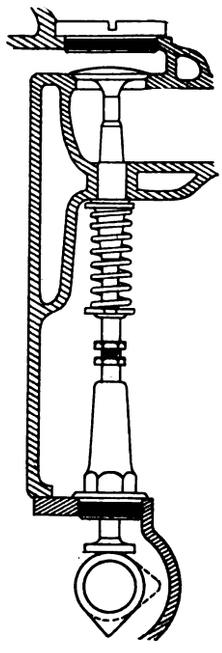
There is another important part which liberal water jacketing plays. All metals expand to a greater or less extent when heated. Because the cylinder casting is subjected to the heat of the burning mixture to a greater extent than are the valve stems, there is the possibility that the cylinder casting may expand sufficiently to permit the valve stems to fit too loosely in their guides. Obviously the result is a slight noise, which is quite likely to increase because of the wear resulting from foreign matter working in between the stems and guides. As a general rule, however, manufacturers are careful to provide ample water jacketing, and the ultimate effect on the silence of the valve mechanism is considerable.

About a year ago, when manufacturers first began to turn their attention to obtaining more silent operation of valve mechanism than previously had been obtained, the outside removable cover plate for valve springs, stems and guides sprang into popularity. Though there is little doubt but that such cover plates actually do silence valve noises to a certain extent, it is not in this respect that they are most useful. As a matter of fact, they may actually defeat their own ends by acting as sounding-boards to accentuate valve noises. That is, unless they are carefully made and fitted. Their real value lies in the fact that they serve to protect the valve mechanism from the insidious action of the grit which forms a very considerable portion of the road dirt and dust drawn in by the cooling fan and distributed indiscriminately over the engine. Thus they serve the cause of silence by reducing the wear which naturally takes place. Given a fairly silent valve mechanism, and if it is enclosed by means of a tight cover, it stands to reason that it must remain silent for a longer period than a mechanism which is not enclosed and which therefore wears more rapidly. Incidentally, the cover assists in that it permits better and more copious lubrication of the parts.

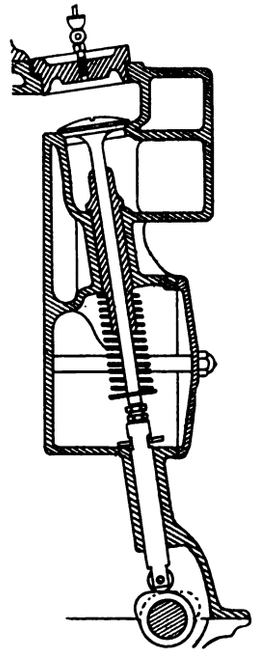
As regards the amount of play there should be between the ends of the valve stems and the valve tappets, opinions differ. Though at one time it was thought that if some means could be provided whereby the valve stems and the tappets could be maintained in constant touch noise would be practically eliminated, experience has proven that such is not the case. Innumerable methods of attaining just this end have been suggested, and a great many of them have been put into use, but at the best they serve only to prove that the source of noise must be searched for elsewhere. Owing to the fact that the valves themselves expand slightly under the action of the heat combustion, it is necessary to allow a certain amount of space between the stems and the tappets when the valves



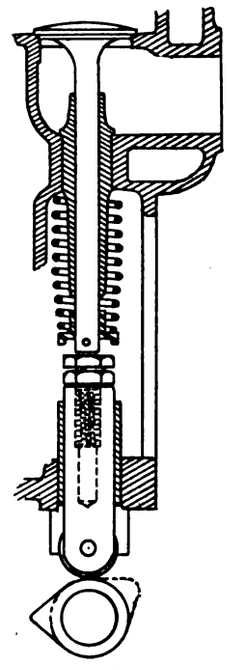
RAMBLER



SPEEDWELL



KING



BEAVER

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are closed. Theoretically, this distance should be just such that when the valves have reached maximum expansion they will seat perfectly when closed. It is difficult to gauge this distance, however, for even two valves of the same size and material may expand differently, due either to the local heat being greater in the region of one of them or to some slight difference of composition which cannot be detected. Consequently, most manufacturers adopt an arbitrary limit to which all tappets are set. The clearance between the valve stems and tappets in Hazard motors, for instance, is .005 inch for exhaust vales and from .002 to .003 inch for intake valves; Velie valves are adjusted for a clearance of .005 inch, and by way of pointing out the diversity of opinion that prevails, the clearance in Continental motors is as low as .002 inch.

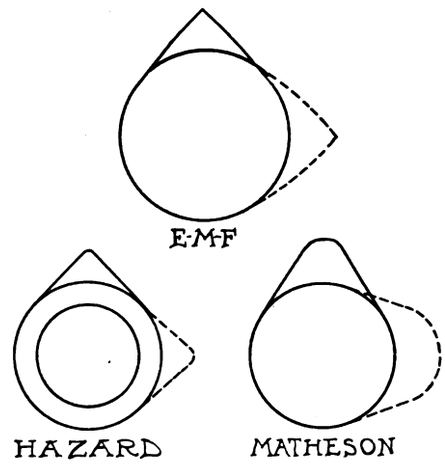
But as great as has been the achievement of quietness by reducing the amount of clearance between the valve stems and the tappets, and by careful water jacketing and adding well-designed, snug-fitting valve spring covers, by far the greatest advance which has been made is in the profile of the valve cams. A very few years ago a cam was a cam, and nothing more. Cams were designed primarily to open the valves and to hold them open for a certain length of time, according to the individual ideas of the designer. Provided the end in view was attained—i. e., the valve opened and closed at the proper time, and the horsepower chart showed what in the estimation of the engineer was a sufficient percentage of the indicated horse-power available—there was an end of it. In other words, it was a case of "Let well enough alone."

But now things are different. Though it has been known for a long time that cam profiles play an exceptionally important part in the production of power and the silence of operation of the engine, it is only comparatively recently that manufacturers have viewed their cams in the right light and turned to them, almost as a drowning man turns to a straw. The result is that in a remarkably short space of time cam profiles have changed almost beyond recognition from their original shapes. And the most interesting part of the whole thing, the part which actually proves the wisdom of the manufacturers in substituting new cams for old cams, is that the efficiency of the engine has increased in no small measure, and lack of noise, that chimera which every manufacturer earnestly is chasing, now is more complete than it ever was before.

In the first place, a cam must open a valve quickly and maintain the passage for the gases open during a certain portion of the stroke of the piston; also it must close quickly. In action, the push rod, sliding over the cam, is pushed upward and transmits the movement to the valve, which opens. As the cam rotates still further, the push rod follows the contour and lowers the valve into place again. Which is all very well and good as long as the rate of cam rotation is low. But, when the speed of the engine is increased and consequently the speed of the cam, there is a tendency for the push rod to "jump"—to fail to follow closely the contour of the cam.

It is the duty of the valve spring to maintain the valve tappet and the cam in constant contact during the whole of every revolution. If the cam is of such shape that there is considerable tendency for the tappet to "jump," it then becomes necessary to use a fairly heavy spring pressure. The higher the spring pressure, of course, the greater will be the wear on the cam and the camshaft bearings, and, unless the cams are carefully designed with this contingency in view, the greater will be the noise caused by the seating of the valves.

However, that the spring pressure is not governed by the shape of the cams entirely



CAM PROFILES THAT DIFFER

may be judged by comparing the following table with the shapes of the cams as shown in the accompanying drawings, which are made to scale and represent the various valve mechanisms in use as they are:

Motor.	Valve Diameter, Inches.	Valve Lift, Inches.	Spring Pressure, Pounds.	Seat Angle, Degrees.
Rutenber	2	3/8	65	45
Speedwell	2 1/8	5/16	46	45
Great Western	1 7/8	3/8	In 45 Ex 50	45
Cadillac	1 3/4	11/32	45	45
King	1 13/16	5/16	45	45
Winton	2 1/16	In 5/16 Ex 11/32	60	45
Chalmers	In 2 1/4 Ex 2	1/4 9/16	35 45	Flat 45
Pullman	2 1/8	3/8	40	45
Rambler	1 11/16	5/16	60	45
Overland	2 1/8	In 3/8 Ex 7/16	40	45
Matheson	2	3/8	85	45
E-M-F	2 3/32	1/4	30-38	45
Hazard	1 5/8	9/32	In 24 Ex 30	45
National	3	1/2	In 80 Ex 90	45
Velie	2	3/8	45	45
Peerless	1 3/4 2 2 1/4	5/16	40 45 55	35
Falls	2 1/4	5/16	65	45
Packard (6)	2 1/8	3/8	50-53	45

By way of still further illustration, the cam profiles as used in E-M-F, Hazard and Matheson engines are shown herewith, drawn to scale. Though it might appear that owing to the comparative sharpness of the E-M-F cams the spring pressure would require to be greater owing to an apparently greater tendency to cause the push rods to "jump," the actual pressure used is as low as from 30 to 38 pounds. Hazard cams, which are slightly flatter, require even less spring pressure according to the investigations of the designers, the best effects being obtained with 24 pounds pressure on the exhaust cams and 30 pounds on the inlet cams. Matheson cams, on the other hand, and the exhaust cam in particular, are very much flatter, and yet the valve spring pressure used is 85 pounds. None of these engines is noisy, and the Matheson engine in particular is noted for its quietness of action.

Obviously, the weight of the valve itself has considerable to do with the spring pressure which must be used and with the silence which can be obtained. For instance, if the valve is heavy and the cam is rotating rapidly, the inertia of the valve will be considerable. In order to overcome it, the valve spring must be increased. Consequently, not a few manufacturers have concentrated their efforts on decreasing the weight of their valves. The differences in weight which obtain may be judged from the pictures. Some of the valves, it may be seen, are much lighter than others, and, all other things being equal, they should be the quietest. There is a limit, of course, to the degree to which a valve may be lightened. There must be a certain amount of metal in order to stand the strain and to retain its shape under temperature changes.

Valve seat angles, as a rule, are 45 degrees, though there is a notable difference in the case of Peerless engines, in which the angle is but 35 degrees. At any rate, 45 degrees appears to have become standard. With a very much smaller angle there is danger that the valves may stick, and with larger angles noise is increased slightly.

In the case of the engine used in Overland cars, the designers have adopted a novel method of ensuring the lubrication of the push rod and valve stems. The push rod works in a die cast bushing inserted in the crankcase. This bushing has two grooves in it which serve to return oil, trapped in a recess, to the crankcase. The oil is prevented from splashing out by a steel washer. The upper end of the push rod contains a set screw, which has a fiber insert upon which the end of the valve stem bears. On the lower end of the valve stem guide a recess is made in which is placed a felt washer, held in place by a steel cap and a light spring, which is supported by the valve spring cap. When the mechanism is assembled the washer is soaked in grease, which lubricates the valve stem and also prevents the leakage of gases. The whole assembly is enclosed by means of a split housing, the removal of which exposes all the parts for adjustment or replacement. In the Cadillac engine a similar arrangement for lubricating the valve stems is used, though the push rods are lubricated by splash from the engine crankcase.

Continental practice embraces the use of

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slightly crowned push rods, which construction, according to the manufacturers, "seems to do more than anything else toward reducing noise." "This probably is due," explains W. A. Frederick, of the Continental Motor Mfg. Co., "to the push rods being slightly out of square with the camshaft, and the push rod when ground flat would bear on the corners, while if slightly crowned the bearing point would be in the center of the push rod. The cam should strike the push rod in the center, thereby allowing the push rod to rotate and distributing the wear evenly." Such crowning now is used extensively by other manufacturers as well.

Similarly, the extension of the "foot" of the push rod also is universal practice, as it tends to reduce the side thrust given by the cam to the push rod. The illustration of the Model engine shows this feature well, and a little study of the drawing will make plain the theory involved. The valves of the Model engine are rendered more silent by the insertion of the fiber plugs in the ends of the tappets. Rambler practice also embraces the use of fiber-tipped valve tappets, which construction eliminates the metallic click which offends the ears of some. Speedwell practice is slightly different in that the push rod guides are entirely outside the crankcase. Otherwise the construction is orthodox, and silence is obtained by careful workmanship and adjustment.

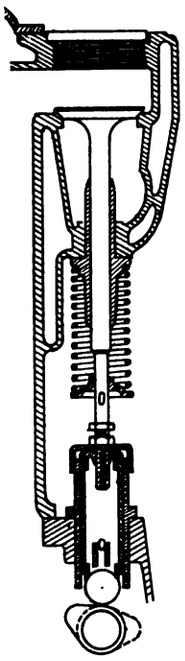
Instead of providing a plain surface at the end of the push rod to bear on the cams, quite a number of manufacturers incline to the use of roller contacts. As to whether this construction is better than the other is a matter of opinion. Suffice it to say that the number of exponents of each method of construction is very nearly equal, and some manufacturers even make both styles. Beaver motors, for instance, are made either way, the roller style of push rod contact being illustrated. In King engines, the roller contact also is used, and the whole mechanism is slightly out of the ordinary in that the valves are inclined at an angle toward the combustion space. The inclination, however, is not by way of increasing the quietness of the mechanism, but rather to increase the efficiency of the engine by bringing the valves closer to the combustion chamber, and thus reducing the distance the gases must travel and quickening the rate of flame propagation.

Packard construction also embraces the use of a roller contact between the push rods and the cams, and the quietness of the mechanism is insured through lubrication and protection from the ingress of foreign substances. The push rods work in bushings in the crankcase, the joint at the sliding contact between the push rod and the bushing being protected by a tight-fitting cap. Packard engineers were among the first fully to realize that lightness of valves and valve parts plays a very important part in the ultimate silence of the engine, and to this end the parts have been made as light as is consistent with the work which they must perform. As an instance of the thorough manner in which the problem of lightening the parts has been attacked, the push rods, instead of being solid, which is usual, are made of cold-drawn seamless steel tubing.

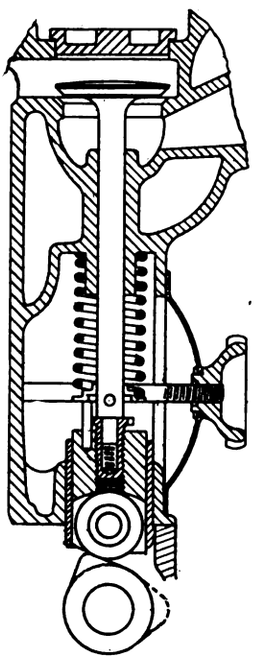
Fairly large valves with a comparatively small lift are the features which makes for silence in Winton engines. These, with careful design and workmanship, including a tight-fitting protecting cover, insure the minimum of noise and the least possible fear. The lubrication of the push rods is effected by splash from the crankcase.

To avoid side thrust by causing the cams to move the push rods straight up has been the object of the manufacturers of Rutenber engines, who have evolved an exclusive and distinctive method of valve actuation, which is noted for its quietness of action and its wearing qualities. As may be seen in the accompanying illustration, the cams do not bear directly on the push rods, but actuate levers which in turn move the push rods. By reason of the construction, the cams which are used may be considerably smaller than is usual because of the leverage which is obtained. The actual amount of lift that is imparted to the levers is multiplied two-fold by the outer end of the levers, where they come in contact with the push rods. Incidentally, this method of construction permits very close adjustment, which, with a tight-fitting valve spring cover, decreases audible sounds to the minimum.

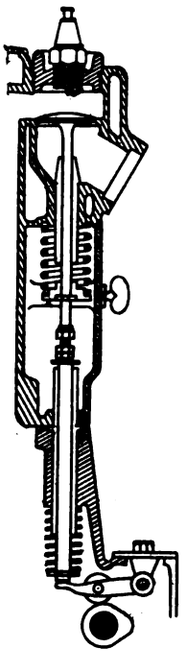
After all, the problem resolves itself into a question of perfection of design first, perfection of workmanship second, and perfection of material third. Some engines embrace all three considerations, and consequently are quiet—even as quiet as any of the various poppet-valveless engines; others embrace but two of the considerations—either two—and are not as quiet; and others embrace but one consideration and are noisy. When all engines are built around the three considerations, which scarcely is possible, all will be uniformly quiet, and though it is doubtful that such an event ever will come to pass, it is perfectly apparent that present-day engines are more quiet than were their immediate predecessors. Similarly, it is quite probable that the engines of the future will be even more quiet than the engines of the present.



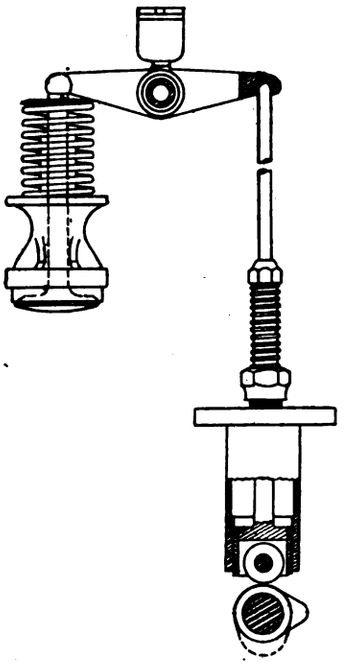
PACKARD



WINTON



RUTENBER



DORRIS

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WIRE WHEELS AS REAL FACTORS

Backed by Previous Experience, McCue Takes Up Their Manufacture in Earnest —Features of His Productions.

It undeniably is true that there is a growing sentiment in favor of wire wheels, and unlike other sentiments which have sprung from almost purely esthetic motives, it is backed by real reasons of quite another nature, reasons that appear to be well supported by proofs of tire economy that are nothing short of remarkable, and which are wholly apart from those which induced the use of enlarged bicycle wheels when the automobile was very young and very tender. Though it has been said that the British are notoriously slow to take up with anything until its worth has been demonstrated, they have taken quite readily to the wire wheel, and despite opinions to the effect that it is virtually "Hobson's choise," the tests which recently were conducted by the great English Daimler company, by which it was claimed that as much as 70 per cent. greater tire wear was obtained from tires fitted to wire wheels, scarcely can fail to allay the suspicion.

Of course these tests were conducted under almost ideal conditions. The roads abroad are well known to be better than the roads in America and the cars were driven by expert chauffeurs. Inasmuch as the cars were "let out on hire," to use a British phrase, it is inconceivable that they were driven at high rates of speed. But even in view of such considerations, if the tire economy was even half as great as is claimed, and there is little reason for supposing that it was not, there is just cause to sit up and take notice. At any rate, the experience of motorists who have used wire wheels in America under other than ideal conditions, in long cross country tours, where the roads encountered were good, bad and indifferent, appear to substantiate the claims for considerably greater tire economy. At least, those motorists who have used wire wheels have nothing against them, and though few can exhibit accurate data, the consensus of opinion is that tire wear is less, resiliency is greater and the danger of accident due to fractures is considerably reduced.

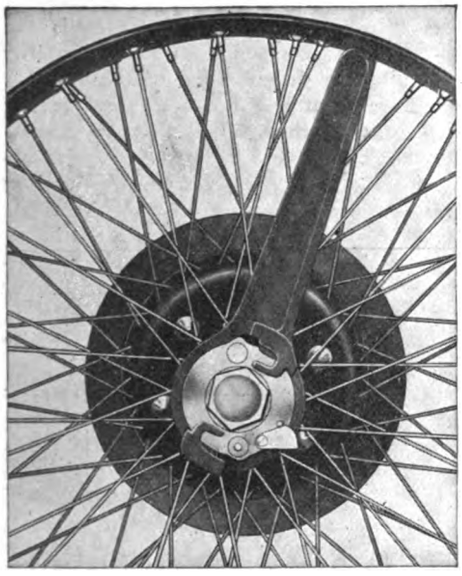
In view of these facts, it is perhaps surprising that American manufacturers have not previously seriously considered the wire wheel. It is known now that several prominent manufacturers are experimenting with them with the view to their possible utilization in the near future, and it is freely predicted that there will be a rush for wire wheels in 1913. The wire wheel itself is neither new nor novel, of course, and is largely a heritage from the old bicycle days. As to why the wire wheel should be better than the wooden artillery wheel for automobile use, there probably is no better simple exposition of the theory, the way and the wherefore, than that which was given by H. L. Heathcote, B. Sc., a noted British engineer, in a paper which he read before the Royal Society of Arts in England.

"Wheel building is the counterpart of tire inflating," he said, "and the art produces its best when sufficient tension to produce torque rigidity is combined with conditions that develop in the wheel a maximum cushioning effect. Such a wheel by co-operating in the duties of the tire, lengthens its life and lessens its liability to wear, cut and puncture. Both the wheels of antiquity and the artillery wheels for motor cars owe much of their lateral strength to the high moment of inertia of their heavy woodne felloes, the disadvantage of which is their inflexibility and their inability to absorb shock."

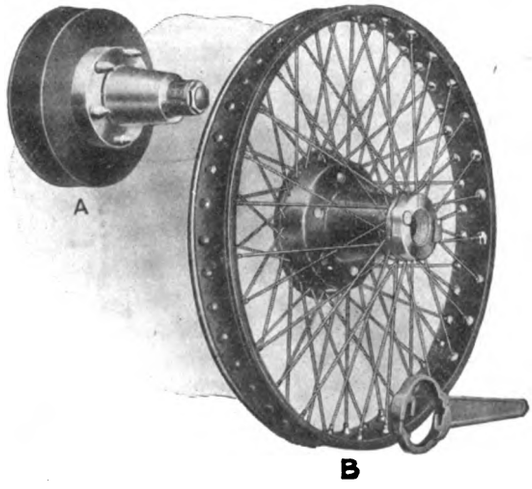
The wire wheel overcomes practically all these difficulties. First and foremost, it is a tension wheel, the hub, and consequently the weight supported by the hub, being suspended from the rim by means of the wire spokes, which generally are about 72 in number. Consequently, the load is more evenly distributed over the spokes than it is in the case of a wooden wheel. Furthermore, it is more resilient by reason of the properties of the materials of which it is made. And last, but not least, because of the comparatively thin section of metal on which the tire is mounted, greater facility for heat radiation is afforded. This, in itself, it is stated by eminent tire authorities, is a feature which should conduce to lessened tire depreciation, for it is well known that heat has a deleterious effect on rubber.

So far, but one American manufacturer seriously has taken up the production of wire wheels for automobiles. That company is the McCue Co., of Buffalo, N. Y. Despite the fact that the McCue company only recently undertook the manufacture of such wheels, the undertaking is far from being in the nature of an experiment. The McCue company, as is fairly well known, had made wire wheels for a long term of years, and during the pneumatic tired carriage period, from 1895 to 1907, the experience with thousands of sets of wire wheels has been that tire wear has been increased as much as 100 per cent.

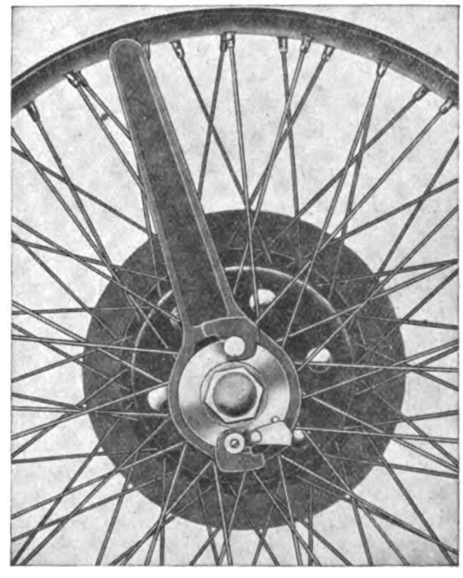
The McCue wheel, as may be seen by the accompanying illustrations, follows closely the general lines of accepted practice abroad and consists of the hub (A) which is rigidly attached to the axle of the car, and the demountable wheel (B). Completing the equipment is a special wrench which forms a very important part of the assembly, inasmuch as dependence is placed upon it to insure that the wheel is positively locked in place when once applied. To remove a wheel, it is merely necessary to apply the wrench, which, by reason of its construction, and the con-



APPLYING THE WRENCH



HUB (A) AND DETACHABLE WHEEL (B)



WRENCH IN POSITION

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struction of the locking mechanism, automatically releases the locking dogs, when a few turns screw the wheel off the hub. When a new wheel is applied it is impossible to remove the wrench until the wheel is securely locked. In other words, the locking of the wheel automatically releases the wrench, which then may be removed.

In summing up the advantages of the wire wheel, President C. T. McCue, of the McCue Co., points particularly to the saving in weight which it permits. "Five detachable wire wheels," he says, "will weigh very much less than four wooden wheels with demountable rims and the usual fifth demountable rim carried. The cost to begin with may be a trifle more, but eventually that will even up. For the present, or until the wire wheel is used exclusively, the manufacturer of cars will require axles so designed that either wood or wire wheels can be used, and if the English practice is followed, the wire wheels will all be enameled black, the same as fenders are now made, so that the car manufacturer can assemble his car with a finished set of wheels for any car he may make."

Proper Way of Caring for Chamois.

While most people think that one piece of chamois leather is as good as another for the purpose of cleaning automobile bodies, the careful garage man soon discovers that one will give good service, while the other will scratch the polish after a single day's use. Sometimes it's the fault of the cleaner in not properly caring for the leather, but more often it is the fault of the buyer in not selecting a good leather. Many will accept the first skin that is pased to them, when as a matter of fact a very careful selection should be made in order that the softest may be secured. A new chamois cannot be used on the body of a car because of the fuzz that it leaves behind it. The first ten or twelve times that it is used it is full of an oily substance, and for the purpose of being "broken in" it is advisable to use it on the running gear first, because this part of the car does not call for such high polish as the body. Once the leather is broken in, it is important that it be kept very clean. It should be soaked in soapy water without much lye and then put through a wringer. The best way to thoroughly clean a chamois is to put it flat on the washrack and scrub it with a soft soapy brush, all the while allowing a stream of water to run over it. If it is too greasy, the oil can be worked out readily in distillate of gasolene, and the leather then be forced through a wringer.

Mirror That Serves Useful Purpose.

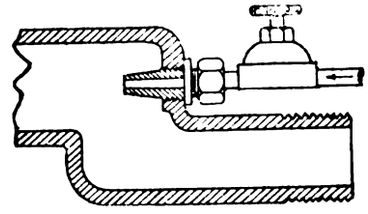
While the trick is of course a very old one, it often is not remembered that a small mirror is exceedingly useful to reflect a ray of light on a dark spot on a motor; for instance, the breaker box of a magneto. This is particularly useful where the motor is not very accessible and examinations have to be made at long range.

SIMPLIFIES WATER CIRCULATION

Attractive Device That Employs Exhaust Gas for the Purpose—Drawbacks That Actual Use May Develop.

During all of that period which served for the introduction of new and radical ideas into the design of nearly all of the vital parts of the motor car, and during which ignition, lubrication, transmission and carburation systems were brought to their present state of comparative perfection, it is significant that but two methods of causing the circulation of the cooling water have been employed—movements by means of convection currents and movements by means of a mechanical pump.

It is true that changes have been made in the design of the apparatus incidental to the correct operation of both systems; that



OWERS'S "INJECTOR" PUMP

the radiator has assumed various forms; that the shape and the scope of the jacket around the cylinder have been altered somewhat, and that where a pump is used to circulate the cooling medium, improvement in design and in the method of drive have not been lacking. But the fact remains that no really new method of propelling the liquid through the jacket, radiator and connecting pipes has been developed.

Recently, however, a device of that sort has been brought out by Owers & Son, of Chiswick, England, and naturally no little interest attaches to it, for not only is it charmingly simple, but apparently it combines the good points of both the pump and the thermo-siphon cooling systems. The device, which is shown by the accompanying illustration, consists of nothing more than a section of pipe bent twice at right angles and having a small nozzle projecting into it. The part into which the nozzle projects is slightly larger in diameter than the rest of the section. The operation is simple in the extreme. The pipe connecting with the nozzle conducts a stream of the gas from the exhaust manifold, and the impact of this gas at relatively high velocity against the water in the pipe causes the movement of the liquid. It is claimed that the circulation caused is much more rapid than can be attained with the thermo-siphon system, even with the aid of specially large connecting pipes, while all of the mechanical difficulties of the pump system and all of the dangers consequent on the breaking of the pump driving shaft are avoided. The quantity of water circulating through the system can be varied at the will of the operator simply by opening or closing the cock which limits the supply of burned gases, and the design being simple, no reason exists for not incorporating the apparatus directly in the cylinder casting.

As is the case with everything possessing virtues, it is not at all unlikely that the "injector" or "aspirator" also will have its drawbacks, which will tend to limit the scope of application. Naturally, the introduction of the warm gases will tend to increase the temperature of the cooling water, and this is hardly a desirable feature; but it is not probable that this trouble will be so great as to need attention, since the tube through which the gases are injected is said to be but ⅛ inch in diameter. The composition of the exhaust gases is the stumbling block which in all probability will stint the development of the practice. The gases contain, besides a great quantity of nitrogen, carbon dioxide, carbon monoxide, free carbon and unconsumed hydrocarbons. If the water used in the cooling system were perfectly pure at all times, the negative effects consequent upon the introduction of the exhaust gases would be confined to the slight amount of harm caused by the solvent action of the hydrocarbon and the carbonic acid, which is formed by the carbon dioxide in the water. If, however, the water contains certain more or less common salts in solution, and this is generally the case, the presence of the carbon dioxide causes precipitation of insoluble salts, and this is especially true when the water is warm. As a result, it is not unlikely that "furring" of the radiator would be a much more common occurrence with the "injector" than with the present systems, and that the cooling water would have to be renewed quite frequently. The simplicity of the contrivance is so impressive, however, that it wisely cannot be dismissed with a breath.

To Prevent "Furring" in Radiators.

"Furring" in the radiator is in most cases caused by the formation of calcium varbonate, which is precipitated from the water when heated. If sal ammoniac, which is the commercial name for ammonium chloride, be added to the water which contains calcium carbonate the result would be the formation of calcium chloride and ammonium carbonate, both of which are soluble. The insoluble carbonate then could be removed.

Why Water Level Falls in Radiator.

It not infrequently happens that when an empty radiator is filled up and the car run a short distance the water level will be found to have fallen considerably, though no overheating has occurred and no leak exists. The reason is that the water requires some little time to percolate through the various restricted passages in the cooling system, and a little "shaking down" results in a falling of the level.

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POINTING THE EASY ROUTE TO GETRICHQUICKLAND

Astonishing and Enticing Means Employed by the "Greatest Automobile College in the World" to Catch the Would-Be Chauffeur's Coin—"Masters of Gas Engines" Evolved in Twelve Weeks, and Before Graduation, and After, There's Money, Money Everywhere if Not a Cent to Spend.

Ordinarily, the prospectus of an educational institution is about the most cut-and-dried bit of literature the printer is called upon to turn out, and anyone who sends for one knows just about what to expect. The curriculum is innocent of the feeblest germs of humor, and after extracting a few essential facts and noting that, as usual, the place ought to be a health resort, so salubrious are the climatic and sanitary conditions, the catalog is forgotten. Correspondence with an institution of learning cannot be expected to increase the pulse rate to any appreciable extent; and as for the matter of fees, they are fixed and unalterable. The whole business is prosaic to the point of absolute dullness—and the reality usually is exactly what it is pictured, in every way.

But as a breaker of images, a destroyer of traditions and a shatterer of ideals, that ultra-modern institution, the "automobile university" without the least doubt is entitled to the palm. Its literature is filled with surprises, its advertisements, placed freely where they will be seen by those for whom they are intended, are amazing in the exuberance of their promise, and the unconscious humor of their correspondence caps the climax. So far have some of these "colleges" departed from scholastic custom and tradition that the whole thing actually is a huge joke from beginning to end. From the modest admission, printed on the front cover of a representative catalog, that the establishment is "the greatest school of expert automobile engineering in the United States" to the shrinking statement on the last page that "there is no other school like it," the catalog ought to be worth its weight in gold to the dyspeptic, for there is a laugh on every page.

While there is a good deal of sameness about these "automobile engineering universities" in the matter of advertising—and in the schools themselves, for that matter—some carry the principle of "anything to get the money" to greater lengths than others. Advertising in technical and semi-technical periodicals usually is the first step, and the men who are of the sort to be impressed by the "gorgeous, glittering, oh-listen-to-the-band" (as the circus press agent would say) prospects that are held out by these literary gems are just the men who might be expected, and are expected, to "send for our catalog." And the picture of one of these simple-minded fellows perusing the pages and the reams of printed and typewritten and mimeographed stuff sent to him through the mails is rather pathetic and more than a little calculated to arouse indignation, for the whole business is so cunningly planned as to appeal not only to the cupidity of the indolent ne'er-do-well, who, in his ignorance, thinks he sees the gates of prosperity standing ajar, but also to the ill-informed but really ambitious youth who has an honest desire to make something better of himself and who is willing to devote his scanty savings and his infrequent spare hours to the task.

Perhaps the most daring and enterprising, and therefore the most interesting (from a certain point of view) of these loud-talking "colleges" is "The Automobile College of Washington," of Washington, D. C. A perusal of the voluminous letters and the school prospectus, which requires at least three good looks to distinguish it from a motor car catalog, reveals the fact that the "Automobile College of Washington" purports to be a good deal more than its name implies; without doubt it actually is something more than a mere educational institution, as will appear later. The "college" boasts that "we consolidated with 'The Carter Motor Corporation,' in whose factory the 'Washington 40' is built, and we now have the further advantage to speak of that we are the only school in the world which trains its students right in the factory." This statement is apparently given weight by the printing in the pamphlet of a number of views of cheerless factory interiors, with such captions as "Our students assist in all kinds of construction work" and a repetition of the ubiquitous phrase "The only school in the world training its students," etc. There is a reproduction in the back of the catalog of a letter from the Carter Motor Car Corporation expressing satisfaction in the "graduates of your college we have employed" and stating that graduates of the "college" will be given the preference when men are being taken on. Notwithstanding all the palaver about "consolidation" and "factory training," the Carter Motor Car Corporation went into bankruptcy about two months ago—despite the free labor supplied by the "college students."

Among the very first of the college's amazing propositions offered is "our automobile agency plan." A conspicuous page in the catalog is devoted to the setting forth of the "plan," and is headed, "Our course prepares you to earn $4,800 a year, or more." Briefly, the "plan" is that "all those who become students of this college will be made sales agents for the Washington cars, shown in this catalog, the price of which is $2,250 for either model, fully equipped. We will allow our students a commission of $400 on each car they sell." And rubber stamped on one corner of the page is the information that owing to the reduction in the price of the car from $2,250 to $1,750, the commission shrinks to $175 for each car. But the catalog goes on to say that any student who purchases a demonstration car will be given "our course free of charge." And the siren sings on, "It should be a very easy matter to sell a car a month, and that would mean a yearly income of $4,800 to the agent. Suppose you only sold six cars a year, that would bring in a profit of $2,400 a year." The rubber stamp does not explain how these figures agree with the reduction in the price of the car or the considerably more than corresponding drop in the amount of the commission. Perhaps it would not sound quite so enticing. It is earnestly urged that all those who purchase demonstrating cars proceed to Washington and "complete our course right in the factory," so that the "agent" will be enabled to make more sales. "However," continues the catalog, "we will appoint you as our agent whether you purchase a car or not, and will supply you with catalogs, printed matter, etc., if you become a student of this institution." It is impossible to escape the conviction that if the authors of this naive bit of printed matter had half as much faith in the "plan" as they struggle to instil into their readers they would be earning "$4,800 a year or more" by following their own directions.

This, however, is not all, by any means, for it would appear that the "Automobile College of Washington" is a good deal more interested in giving young men opportunities to get rich—and incidentally to peddle the wares of the A. C. of W.—than in educating them. The further the catalog and the letters are perused the deeper the path leads into marvelous "business opportunities" and the further it gets from its supposed subject—a technical education. "The very day you enroll," the flow of language ripples on, "you may" (note the gracious permission) "begin to send in the names of young men whom you think might be interested in our course." It is estimated that half of such young men will enroll, and as the school pays $3 a head for every student brought in according to this plan, it is suggested that "you should

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pay for your course several times over in this manner." At this point the reader who values his sanity should hastily turn over to the next page and look at the pictures, for if he stops to think he will presently be lost in a maze of calculations that will make a mere bagatelle of the mathematical gyrations of the man who figured the descendants of a single hen for a few years into the future. If every student paid his way through "college" several times over—or even twice—the entire District of Columbia soon would be required for the campus, and the bursar would be kept busy paying for new students at a rate that would increase beyond the capacity of the most capacious adding machines. And if students just paid their way through once, there would be nothing doing but instructing pupils free of charge and putting up new "college buildings" to take care of the increase. Doubtless this possibility led the "faculty" to adopt the "agency" plan, which provides for a little unencumbered income for the "college."

However, the ramifications of this very versatile institution have not all been explored. Read on. "If you wish to travel," begins the next explosion of beneficence, "we have one of the largest automobile supply houses in the country, and the very day you enroll for our course we will make you our agent for this department and we will pay you $1 for each new customer you secure for us," to say nothing of a commission of 5 per cent. on purchases made by such customers. This, it is cheerfully maintained, will provide a steady income "without any effort on your part." Again it seems hard to realize that men should be willing to sacrifice their lives in teaching when there is so much money to be picked up "without any effort." But the large-hearted faculty of the A. C. of W. will do even more than this.

Even after a student "graduates" and has been solemnly invested with a diploma (by the way, "when you have earned this diploma you are a master of the modern gas engine") he is not forgotten by the faculty, for the catalog says so—and, besides, a school that turns out men who are made capable of earning "$4,800 a year or more" naturally likes to keep in touch with some of the $4,800 if possible. Therefore, "if you desire to go in business for yourself, we suggest that you let us select a good town for you when you graduate, and from the repair business, the agency for the Washington car and the sale of automobile supplies from our supply department, and as special representative of our school, you should have a big income all the year round." This particular part of the matter is too important to be lightly passed over. Near the end of the catalog, just before the pages of sickeningly sweet "testimonials," a couple of pages are devoted to an array of figures and statements that are calculated to make the reader wonder how it is possible to keep any able-bodied man out of the automobile business. "$21. a day" begins this part of the story, in letters so big that they nearly fall off the page. "We start you in business for yourself." ($20 a day would have been a smooth-sounding phrase, but the odd dollar sounds so much more accurate!) It seems, according to the prospectus of this "educational institution," that there are openings for garages and repair shops in a thousand small towns where "amazing profits can be made." A "detailed statement" is given, showing just how "an average profit" of $21 a day can be earned. All that is necessary is to open the garage—there are no expenses connected with this ceremony, apparently; the garage will be all ready for business as soon as the "graduate" steps in—do eight hours work a day on repairs, at a dollar an hour; sell 100 gallons of gasolene, paying 10 cents a gallon and getting 18 cents; dispose of 15 gallons of 30-cent lubricating oil at 80 cents a gallon, and store 15 cars at $15 a month. This totals $31 a day. Then you have to pay an assistant repair man $4 a day, a washer $2 a day, the landlord $75 a month, and for everything else —covered by the term "incidentals"—$1.50 a day. That leaves a net profit of $21 a day, clearly. That is, there ought to be no trouble in making $6,573 a year if the "graduate" has religious scruples and won't work on Sundays, or $7,665 a year if he is a heathen and keeps the doors open seven days a week. But that is not the limit, apparently, for the catalog says "Any experienced man will tell you these figures are conservative. Twenty-one Dollars a Day!" So far as this particular page is concerned, the college would apear to be entirely disinterested; it is a clear case of "helping our graduates to get started in business." But the next page is given up to the other side of the shield, so to speak. "We Supply Tools and Select Towns Where You Start." The tools are supposed to cost from $50 to $100, this to include "all necessary tools for opening the repair shop." This has a burglarious sound, and doubtless $100 worth of tools would suffice to "open the repair shop," but it is quite unnecessary to say how far they would go toward keeping the shop open, to say nothing of earning six or seven thousand dollars a year. But the school again shows wonderful confidence in its graduates. "You can pay part of the cost of the tools out of your daily profits, or at your convenience." Note the word "part." It is not discoverable from a perusal of the catalog or the accompanying literature what proportion this "part" bears to the whole price of the tool outfit, but it is a pretty safe assumption that in case the student graduate fails to clear six thousands a year the "college" will not lose anything on the transaction. The page winds up with an impassioned exhortation to consider the magnificent prospects spread out. And, as if this were not sufficient, it goes a step further and actually advises the borrowing of money from friends "who might help you with a small loan." Here the appeal direct ends, as well it might. It could go no further without suggesting—too much.

Evidently, however, the "college" finds that there are a good many young men who do not respond readily to the first treatment of catalog and three-page imitation typewritten letter, for it is prepared to keep up a systematic bombardment of correspondence that might be taken to indicate that the "college" needs somebody's money very badly, or else that it has the inside track on the price of postage stamps. Letter after letter, and sheaf after sheaf of fac-similes of testimonials, telegrams from automobile manufacturers (marked "paid") beseeching the "college" to "send from fifteen to twenty-five" men, or "send any number of men up to fifty," and so on, keep the postman busy. Finally, after all this has failed to touch the "prospect's" heart (slang for purse), the "college" sends out its masterpiece—its final thunderbolt. This surpassing effort begins with a solemn asservation, "This is the most important letter that you have ever received." The next sentence is touching: "In several letters recently we have tried to give you a truthful idea of the grand opportunity that the automobile business presents to you, but we seem to have failed, inasmuch as you have not enrolled." A series of conjectures as to why the opportunity has been neglected for such an unconscionable length of time follows the opening, and finally the thing that makes this epistle "the most important letter that you have ever received" is brought to light—the secret is revealed. "Here is our confidential message." It needs no detailed explanation or lengthy quotation to convey the information that the "confidential message" consists of an offer to chop off part of the price of the course and let the student pay what is left almost any way he pleases—he even can wait till he has received his education and pay the last installment after he has secured a job! But—"Keep this offer confidential. Special confidential blank is enclosed. It is good for ten days only." Then a few gentle reminders to the effect that such a remarkable offer will not go begging; some other fellow will get his eagle eye on it and snap it up. "For ten days it remains up to you, then, if you don't act you have lost out and the other fellow will be the gainer." Accompanying the letter is a "special" enrollment blank, on the face of which the regular prices and terms are ruthlessly scrambled and scratched with a pen. The use of a well-worn rubber stamp to put on the word "Special" somehow conveys the impression that so many of these special and confidential documents are issued that the labor of writing it with a pen would be excessive. Unfortunately, there isn't space between the lines to alter the prices and terms with rubber stamps—and it certainly wouldn't look well to have these confiding missives printed. Still another document accompanies this fearfully important letter, and lest it should be unnoticed, it is decorated with a huge and

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very red seal— a real seal, stuck on very tight, and occupying a vast area of perfectly good white paper. Under the heading "Notice" come the information that this special offer is made "to Mr. —— —— only," and also that it is good only for ten days from the date, which is carefully inserted in red typewriting in two separate and distinct places. But—it simply is amazing how many "buts" there are in this collection of literature—the last paragraph sets forth, "Reasonable extension of this time limit will be granted"—note the large-hearted generosity—"when request is accompanied by satisfactory reasons."

Having made matters so extremely clear in so many different ways, and having made so many perfectly good and extremely elastic offers in dissolving figures, it might with reason be assumed that the "college" would have reached its limit and that lack of response would cause the very cold "prospect's" name to be withdrawn from the follow-up card index and the astonishing offer passed on to the "other fellow," who might be expected to be very tired after waiting so long for his chance. But not a bit of it! A little later along comes another letter, which begins by expressing curiosity as to why there has been no response to all the offers and appeals and confidential opportunities that must have cost so much postage money to send out, and goes on to recapitulate. The letter abounds in such expressions as "improving your circumstances by a clean and well-paid profession"; "the reasons why you should learn automobile engineering as a profession"; "the only school in the world that trains its students right in the factory"; "do you realize what it means as a life profession?" and so on. Medicine, law, dentistry and engineering are compared, much to their disadvantage, with "our course," which, it would appear, can be covered in ten or twelve weeks, after which the graduate is supposed to be able to launch forth and make half the lawyers, doctors, dentists and engineers in the country hide their diminished heads for shame.

All this sort of thing is very much of a joke to anyone of average intelligence who has read as much advertising matter as have most Americans, and it is so preposterous to those who are familiar with the "automobile business" that it inspires a feeling akin to disgust. Starting out under a high-sounding name as a school, the "Automobile College of Washington" glides easily and naturally into the position of a dealer in anything and everything pertaining to the automobile, and beseeches everyone with whom it can get in touch to become its agent. Commissions are paid on new students brought in; on new customers for "one of the largest supply houses in the country"; on supplies sold; on motor cars sold; students are set up in business—buying their tools and supplies from the "college"—and, in fact, one who takes the "course" is permitted, with overwhelming graciousness, to do practically anything—that will bring money in for the "college." Apparently these student-agents must be profitable to their "alma mater," for it is certain that no stone is left unturned to induce them to "enroll"—even to the extent of urging them to borrow the money.

While on first thought it might be considered unnecessary to call attention to the ridiculous and misleading stuff printed by self-styled automobile schools, the mere fact that such enterprises exist in large numbers and apparently are flourishing is sufficient indication that a great many men must be so loosely attached to their money that they can be persuaded to hand it over in exchange for a "diploma"—or else can detach the price "from a friend." As a matter of actual fact, the ranks of the unemployed are crowded with chauffeurs, good, bad and indifferent—and numbers of them are the proud (!) possessors of diplomas which seem to have lost their job-getting powers since coming into the possession of the present owners. Anyone who wants to try it can get his pick of any number of chauffeurs for an average price per week that is considerably lower than the lowest mentioned in the literature of the "colleges," and a man of only ordinary ability who knows nothing and depends for a livelihood—to say nothing of such things as "easy work and big money"—upon a job as chauffeur is reasonably sure to be kept hustling for work. Of course, a first-class man, be he chauffeur, repair man or what not, usually can do fairly well; but the point is that it is no more possible to give a man all the training he needs for such a position in 10 or 12 weeks than it is to make a doctor of a high-school graduate in a year. A man may well spend a lifetime in study and practical work, and yet be far from claiming to be a "master of the modern gas engine"; nevertheless it is claimed by these so-called colleges that ten or twelve weeks is sufficient time. And as for the possibility of earning "$4,800 or more" a year in any one of a thousand small towns by opening a garage and repair shop—even with the solicitous assistance of the "college"—it is necessary only to find out how many proprietors even of large garages are doing as well, to say nothing of the ridiculous idea of clearing from $6,500 to $7,500 a year in a garage renting for $75 a month and employing two men besides the proprietor. It may be that such things are possible; there are combinations of circumstances that might work miracles, so to speak; but it is quite certain that a twelve-weeks student, with no other knowledge or experience than that extracted from an "automobile college," would not come within a hundred miles of "twenty-one dollars a day."

Horse Driver Gets a Prison Sentence.

For driving a loaded wagon, drawn by two horses, along the public highway between two small villages in central Germany, and causing an accident to an automobile in which the owner of the car was fatally injured, a farmer named Sebastian Roth was sentenced to two months imprisonment. The court lectured him severely on his carelessness; and, despite the fact that the German highway laws do not specifically demand the lighting of wagons in sparsely settled districts, sentenced him under the statute which makes it a misdemeanor to be the contributory cause to an accident.

Emir "Orders" Roads for His Motor Cars.

There are things in which an absolute monarchy, or autocracy, is infinitely superior to a republican government—as, for instance, in the matter of road building. The best roads of olden times were built by the Romans during the reigns of their various Caesars—than whom no present potentate is more autocratic—and the worst roads are in the United States—a modern republic! It takes so long to pass a bill for road improvement, and, after it has been passed, so much of the money voted goes into the pockets of individuals instead of into the road surface, that republican roads are slower in building and more costly than any other kind. All of which serves to emphasize the power of the Emir of Afghanistan, who, by a stroke of his pen, has "ordered" the construction of a complete macadam road system for his kingdom, so as to permit of his use of the various motor cars which he bought a few months ago. The road system will cover the entire country and will aggregate over 10,000 miles, two of the more important highways being 300 and 400 miles in length, respectively. At the present time there is barely ten miles of road in Afghanistan suitable for automobile travel. The project will involve the construction of roads blasted along the sides of precipitous mountains, miles of which will be literally "in the clouds"—the plateau over which the roads lead being the highest in the world, reaching to 20,000 feet, while some of its peaks have an altitude of 25,000 and 29,000 feet.

Must "Furnish Required Identification."

Despite the fact that the New York Court of Appeals has ruled that the provision of the Callan law compelling a driver of a motor car to testify against himself in case of a collision by forcing him to remain on the scene of the accident and to give his name and address to questioning policemen or eye-witnesses, is unconstitutional, other States continue to hold opposite views. The latest decision upholding the constitutionality of such a provision in the automobile laws of a State is reported from Missouri. The opinion was rendered by Judge Withrow last month, and overruled the motion of counsel for one Forbes Kneedler to quash the indictment charging him with running away from the scene of an automobile accident. In his opinion, the judge declared that the law requires a person in an automobile not to "furnish evidence against himself," but to "furnish required identification."

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COMMON TOOLS THAT ARE ABUSED

Part of Cars' Equipment That is Given Small Consideration—Glaring Errors of Inexperienced Users.

In any branch of applied mechanics it is not at all unusual to find that consequences are of a magnitude all out of proportion to their causes; in other words, that little things can cause a great deal of trouble, and, conversely, that equally little things can save a great deal of trouble. While this truism has been iterated and reiterated and used and re-used until it is almost threadbare, so far as the motor car and its various details are concerned, it has not been so overworked in its relation to the tools that are used by every man who takes care of an automobile, whether it be his own or the property of some other man. At any rate, an inspection of the tool kits of the majority of motor cars will indicate that the users of the tools either lack knowledge of many very simple little things or they fail to appreciate their genuine importance and do not make use of the ounce of prevention that proverbially is worth sixteen times as much in the way of cure.

Some people who take care of automobiles cannot be mechanics, and some don't want to, and so they hardly can be expected to pick up the thousand and one little scraps of practical information that are part of the journeyman's stock in trade. But almost anyone is likely to use a cold-chisel occasionally when working on a car, and it is a surprising thing to see what a difference it makes whether the chisel is ground as it should be or as it should not be. This tool should not be ground perfectly straight across the edge; it should be very slightly rounded—only very slightly—and it will be found to cut better and quicker and to hold its edge better than a chisel with a straight edge. Moreover, in chipping off any quantity of metal, for instance from a casting, the round-edged chisel will get a better bite, start more easily in hard places, and will not dig in at the corners, which not infrequently break off in the case of a straight-ground chisel. Of course, if too much curve is given to the edge there will be a tendency to dig in too deeply and break away the edge at the middle. A chisel which breaks at the edge simply because it is too hard, usually will be found about right if it is ground back to the end of the break, provided the piece broken out is not a large one.

The common idea seems to be that because a cold-chisel is a tool for cutting metal, and that it is driven to its cut with a hammer, it doesn't particularly matter whether it is sharp or not; so the average cold-chisel is indeed a sorry-looking, blunted-edged, battered bit of steel. Any doubt on this point will be instantly dispelled by a practical test of two cold-chisels, one dull and the other properly sharpened. Of course, where a cold-chisel is habitually used for starting nuts that are hard to move, it doesn't do to have it sharp; but the fact of the matter is that a cold-chisel should not be used in this way. If a nut has to be forcibly persuaded to turn, the tool should be ground flat across the end and one of the right-angled edges applied to the nut. This form will result in the least possible cutting of the nut and will transmit to the nut the maximum power from the hammer blow.

There are a great many cases where the cold-chisel is used to start a nut just because the nut has had its corners "chewed off," in the vernacular, by the careless use of the wrench—which goes to show how very easily one evil can lead to another, while the second leads to the scrap-heap and also to the hardware store for a new nut. Things are not quite as bad in this respect as they used to be, but, really, the usual condition of the wrenches in the tool box is such that a chauffeur, upon seeing a good set, will involuntarily ejaculate, "Gee, look at the swell wrenches!" The trouble is that the average run of human nature is apt to use the first wrench that will stand a pull without turning on the nut, whether it is a proper fit or not—especially if time presses. If the wrench fits snugly, well and good; it will stand pulling to the limit of its strength and will do no harm to the nut or to its own jaws. A solid wrench—that is, one that is not adjustable as to the width between its jaws—will last for years if properly handled. But if it is too large for the nut it will jam down the corners more or less, according to how much too large it happens to be, and at the same time spring its jaws apart, if sufficient pressure is applied. And the trouble does not end here, for if a nut is much battered up it will play havoc even with a wrench that normally should fit it, jamming between the jaws and springing them and causing wear. About this time the mistreated nut is ready to be "agitated" with a hammer and chisel—a proceeding which, by the way, often results in the hitting of something that really ought not to be hit with the hammer, barked knuckles and various other things of which most chauffeurs, at least, don't need to be reminded.

As for the poor old monkey wrench, it is enough to say that the average tool of this type that has been "in business" for any length of time has sprung and worn jaws, a bent back, an uncertainty that is painful in the action of the adjusting screw, and a head that is all battered up—because the wrench was handy and the hammer wasn't. Wrenches sometimes can be used as hammers when nothing more severe than a gentle tapping is required; but they are not by any means good for this purpose. Moreover, the steel is necessarily too soft to stand the banging; if it was hard enough for hammer work it would be too brittle to stand the breaking strains to which a wrench normally is subjected. It is a mechanical crime to tug at a nut with an adjustable wrench that is not screwed up to fit the nut as closely as possible; to put any strain on it when placed on the nut with its jaws parallel with the axis of the nut; and to pull on it in the wrong direction—that is, so that the back of the tool will be in the lead. This is the cause of "bent backs," for a monkey wrench has much less stiffness when used in this way than when properly used—with the jaw and screw side leading.

Files and hack-saws find prominent places among the crippled and battle-scarred legions of ill-used implements. There is a prevalent notion that these tools are designed to scrape or scratch when at work, so it comes that the unfortunate tools are simply scraped back and forth without rhyme or reason; usually nearly as much pressure is applied on the back stroke as on the forward stroke. The fact of the matter is that these are really cutting tools, and that they cut only in one direction—on the forward stroke. Pressure applied on the return stroke is worse than wasted, for it has a tendency to spoil the cutting edge of the teeth, especially in the case of the saw. And another unappreciated point is that the best cutting speeds are different in differently spaced teeth and in different metals, and a little feeling out will indicate when the metal is cutting best. A big 16-inch mill file cuts best if used with a rather slow stroke but with heavy pressure, while a fine file should be run faster and with less force. In the case of the hack-saw, the speed is of less consequence. For all-round work a medium-sized tooth is best, but for cutting pipe or thin metal better work can be done with fine teeth, which do not stick when going through.

It would be an easy matter to go through the whole list of ordinary mechanics' tools and indicate similar abuses and misuses, all leading to ultimate trouble and expense and loss of time, temper, knuckle-bark and so on. But enough has been said concerning some of the very commonest tools in use to convey the idea that a very little carelessness can make a great deal of trouble, and a little trouble taken can save the infliction of a great deal of it.

To Start Car if Crank is Broken.

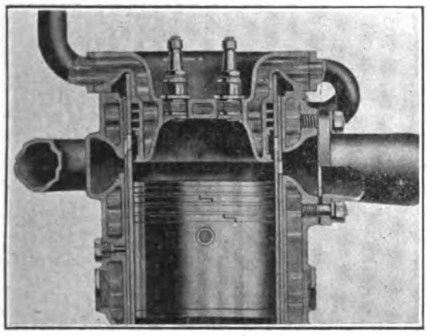
The usual method of starting the motor when the crank is broken is to get the machine rolling and drop in the clutch with the gear in high. If no means of acquiring the required momentum are at hand, and the motor cannot be started by priming and turning on the spark, chock one of the rear wheels so as to prevent the car rolling, jack up the other rear wheel and put the gears in high. By turning the wheel which is free from the ground the motor can be started, but extreme care should be exercised to prevent the jack from falling. This method should never be tried unless a competent person is in the driver's seat.

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COMBUSTION CHAMBERS; THEIR SHAPES AND EFFECTS

One Feature of Gas Engine Design in Which Theory and Practice Cannot Always Be Reconciled — Practical Considerations That May Offset Theoretical Advantages — Wide Variations in Use That Are Highly Efficient Despite Their Divergencies.

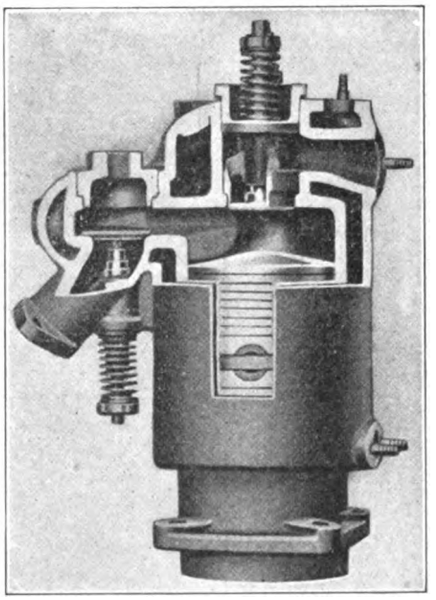
It may be that the time will come when the exigencies of practical design in the internal combustion motor field will not seriously interfere with the adoption of forms that are best theoretically. But that time has not yet arrived; it is well known that in many details there is a great deal of difference between gasolene engines as they should be and as they really are. The reason is that no one part can be built without reference to other parts, for the efficiency and practicability of the engine as a whole depends upon the harmonious working together of all parts. There are many parts which, if constructed strictly according to theory, would so hamper the functions of other parts that the loss entailed in this way would more than offset



COLUMBIA-KNIGHT DESIGN

the gain resulting from the theoretical correctness of that one part. As a matter of fact, the whole gasolene motor is a compromise between what is possible theoretically and what is attainable practically, and the form of the combustion chamber—the space between the top of the piston and the head of the cylinder, into which the combustible charge is forced just prior to ignition—is an interesting case in point.

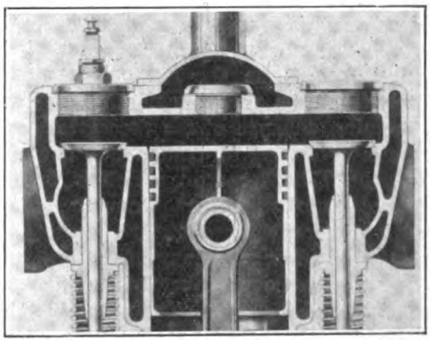
Theoretically, the best shape for the combustion chamber is a sphere. The internal combustion engine is a heat motor, and, as its name implies, the heat which it converts to mechanical energy is generated within itself by the combustion of gases. Obviously every heat unit that is wasted means just so much lost power, and so the form of combustion chamber that involves the least heat waste ought to materially increase the efficiency of the motor. The wall surface of a spherical combustion chamber is of less area, in proportion to its cubic contents, than that of any other form—less by 33 1-3 per cent. than the area of the walls of a cylindrical combustion chamber of equal capacity; and, the radiating surface being less, more heat will be retained and less lost through radiation and consequently the lowering of the pressure of the ignited gases will be lessened. But here practical considerations interfere. In the first place, the piston itself, which must be concave to form the lower part of the spherical chamber, has very little opportunity of getting rid of heat; there is a slight cooling effect from the air on the underside, and the rest of the heat must be transferred through the cylinder walls to the water jacket. A concave piston



STERLING COMBUSTION SPACE

head, having a greater surface area than a flat head, of course, will absorb more heat, and often concave heads have been found to take up more heat than they could get rid of—in other words, they overheated. Nevertheless, this difficulty is not insuperable, for there are many engines built and successfully operated with spherical combustion chambers. To cite a conspicuous example, Knight motors are built with concave piston heads and with cylinder heads which, while not hemispherical, are of truncated cone form, thus exposing to the heat an area that is almost as small as that of a hemisphere.

In the Knight engine, however, such considerations as the location of intake and exhaust passages and valve chambers do not here enter into calculations of the designer, the sliding sleeves closing the ports and forming a combustion chamber that is extremely symmetrical and conducive to heat economy—in fact, the form of the Knight engine combustion chamber is responsible for an appreciable share of the high efficiency of the motor. In poppet valve motors a combustion chamber that is approximately a hemisphere can be obtained only by placing the valves in the cylinder head. This is done in the Jackson motor, for example, and the result is a combustion chamber that is of excellent form, from a theoretical point of view, and that is practical in operation. The combustion chamber of the Franklin motor, on the other hand, is purely cylindrical, though both valves are located in the head.



PACKARD T-HEAD CYLINDER

The use of valves in the head involves overhead valve gear, however, and this is a form of construction that is not in favor with most manufacturers, notwithstanding the excellent results that are obtained from motors of this type. There are motors, such as the Model and the Sterling, though the latter no longer is manufactured, in which there is one valve, the exhaust, in the head of the cylinder, operated by overhead gear, while the intake valve is located in a pocket which forms an extension of the combustion chamber. While the formation of a pocket for the intake valve destroys the symmetry of the combustion chamber, the advantage of a very large exhaust valve can be retained and the valve is very accessible. At the same time, the valve pocket or chamber is not very large, in proportion to the cubical contents of the combustion chamber as a whole.

While the motors employing the valve-in-the-head construction, with either one or both valves in the head, are numerous, the more general types are those known as

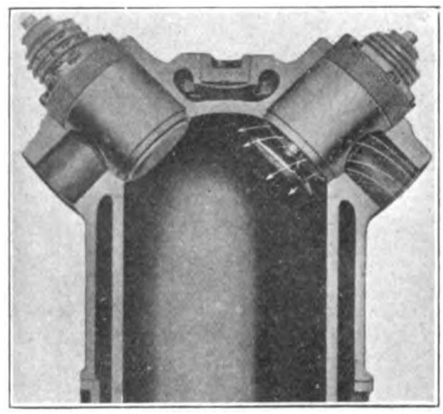
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the L-head and T-head motors. In the L-head motor both valves are located in a single large pocket on one side of the cylinder, and in the T-head type there are two valve pockets, one on each side, the letter-like shapes given to the cylinder castings by the projecting pockets naturally suggesting the descriptive designations popularly applied to motors. The Stevens-Duryea motor is an excellent specimen of the L-head type. Both types have in common the advantage that there is no overhead valve gear, all the valve operating mechanism being positioned far down and in a protected position, and such motors can be built of minimum over-all height. In the L-head motor all the valves are actuated by a single camshaft and the intake and exhaust piping is confined to one side of the engine, leaving the other side clear.

Obviously, these two combustion chamber forms are anything but theoretically correct, especially that of the T-head motor, in which the two side pockets serve to increase very largely the radiating surface and also contain gas that must require more time to burn than if the entire charge was contained in a single symmetrical space so that the flame would not have to travel the distance from the spark plug, which very commonly is placed over the valve pocket, to the remotest corner of the chamber, which in the case of a T-head motor, would be at a considerable distance. In seeming defiance of the theoretical considerations bearing on combustion chamber form, the T-head motor, which is further removed than all others from the shape that it theoretically ought to possess, is remarkably efficient. Many of the best cars built embody this manner of engine construction, and it is particularly notable that most of the phenomenal racing motors have had their valves in pockets on opposite sides of the cylinders.

The apparent lack of agreement between theory and practice involved in this detail of combustion chamber form is strikingly illustrated by the fact that two of the most efficient motor types that have been evolved employ combustion chamber forms that are almost opposites. The Knight engine, on the one hand, has a combustion chamber that is almost perfect, theoretically, and the work of the motor requires no comment. The T-head motor, on the other hand, necessarily is made with little regard for compactness of the charge, yet there is no question whatever as to the practicability of the design and the excellence of well-built motors of the T-head design.

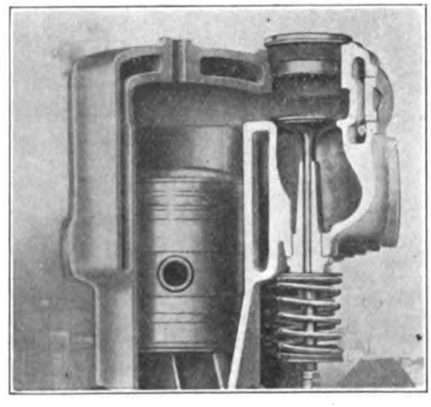
It does not follow, because motors having theoretically imperfect combustion chambers give results in actual operation that are on a par with motors that are more nearly theoretically perfect in this respect, that there is anything wrong with the theory. The trouble is that when it is necessary to sacrifice other features of construction in order to secure a correctly designed explosion space, the losses balance the gains—or so nearly balance them that the choice of combustion chamber form is of less importance than the perfection of other parts directly affecting or affected by it. The correctness of the theory is exemplified by the Knight motor, in which the theoretical form is possible without sacrificing anything in the way of practical con-



JACKSON OVERHEAD VALVES

siderations—rather, theory and practice work together in complete harmony, neither being sacrificed for the other.

As a matter of fact, and as in all other branches of engineering, progress in motor construction is made largely by reconciling practicabilities with theories—by working out mechanical details so that they permit the use of wholly scientific design. And while it is unlikely that it ever will be possi-



STEVENS-DURYEA CONSTRUCTION

ble to bring about a complete agreement between theory and practice, it is a certainty that the motor of the future will be nearer to theoretical correctness in the same proportion that it is superior to the motor of the present time.

New Method of Making Metal Leafs.

By reason of the inordinate costliness of the operations necessary in the manufacture of metal leafs, such for instance as gold leaf and silver leaf, the finished product is expensive and far beyond the intrinsic worth of the materials, and its use therefore is limited. Recently, however, a British patent, No. 27,020, has been allowed on a new process of manufacture which should materially reduce the cost of metal leafs and so bring them into more general use, which, though restricted at present, might be extended to the plating of the reflector portions of lamps and for other purposes in the manufacture of automobile accessories. The product obtained by the new process is styled artificial metal leaf and can be made of any desired thickness; furthermore, it is sufficiently flexible and ductile for embossing in high relief. So far, only bronze leaf has been produced, though the simplicity of the process points to the possibility of its employment for other metals. The metal in powder form is mixed with collodion or some other similar medium and sprayed to the desired thickness on glass, metal, paper or any other substance, which may be either rough or smooth. As soon as the layer is dry, the glass, or whatever the leaf has been deposited upon, is placed in water to detach the foil.

Speedometers as Aids to Gear Shifting.

Though speedometers generally are used to ascertain the speed at which the car is being driven, or to determine that the legal rate of speed is not being exceeded, there is another use to which they advantageously may be put; i. e., they may be used to determine the exact moment when it is proper to change gears. Of course, the time when gears should be shifted will vary slightly, according to the conditions under which the car is being driven, but once it is determined that the engine behaves best at, say, ten miles an hour when second speed is engaged, it may be taken as a criterion that when the speedometer hand points to ten miles an hour and any other gear is in mesh, a change to second speed should be made. If, for instance, the car is being driven through traffic and a momentary slow down to ten miles an hour is necessary, a glance at the speedometer will suffice to allay speculation as to whether gears should be shifted or not. Similarly, when a hill is negotiated, immediately the speedometer shows a predetermined speed, or rather just before it does, assuming the car has gradually slowed down, gears should be shifted. Thus the engine and the car will be saved the unnecessary racking caused when the engine commences to labor.

Polish That Injures Nickeled Trimmings.

In polishing the silvered reflectors of lamps, or the nickeled trimmings that are becoming so popular on motor cars, it is well to bear in mind that every rub means the wearing off of a little of the plating, and that in time it will wear through. A great deal depends upon the kind of polishing material used; a harsh, gritty polish will wear down the plating quite fast, while a good polish will ensure maximum life of the finish.

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THE THREE KINDS OF OVERLOADING

Tire Expert Defines Them and Details the Trouble and Expense They Cause—Remedies Which He Suggests.

While the mutual interest of tire makers and manufacturers of motor truks in the matter of tire life is a subject that has been discussed frequently and at length, it was dealt with in a somewhat unusual manner in the paper "Detrimental effects of overloading and overspeeding on solid rubber tires," which was read by S. V. Norton of the B. F. Goodrich Co., before the recent convention of commercial motor vehicle manufacturers held in New York under the auspices of the commercial vehicle committee of the N. A. A. M.

Norton consistently and naturally took the side of the tire maker, and pressed the claim that there is a good deal of overloading of tires for which the truck manufacturers are directly or indirectly responsible, such as the use of tires too small for their work and the improper distribution of weight, so that some tires are overloaded while others carry less than their share of weight. A third kind of overloading that came in for condemnation was the too common practice of faulty distribution of lading, which usually is done to facilitate the handling of goods. The belief was expressed that there should be a more complete understanding between the two classes of manufacturers, which would give tire makers a chance to make valuable suggestions as to the use and care of tires after leaving their hands. Norton's paper in full was as follows:

"Just what is meant by the overloading of rubber tires? In the process of manufacture crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form, to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits, however, the strain will invariably cause a rupture or disintegration of the rubber.

"To illustrate: Take a strong, properly vulcanized rubber band. Stretch it moderately, release it and it will return to its normal shape. The process may be repeated indefinitely, depending upon the quality of the rubber, and the band will resume its shape. Stretch it beyond its limit of elongation, however, and what happens, The rubber breaks and all the king's horses and all the king's men can't restore it to its previous condition. The damage has been done and the rupture is permanent. Similarly a piece of rubber properly vulcanized maly be compressed within certain limits, released and it will resume its normal shape. The compression may be repeated an indefinite number of times, depending upon the quality of the compound. So long as its limit of compression has not been reached the rubber will continue to spring back into shape and nothing but abrasion or some other physical or chemical action will destroy its 'elasticity.' Compress it beyond its limit of cohesion, however,—or, in other words, beyond its power of resistance —and the rubber breaks down or ruptures just as inevitably as in the case of stretching beyond its limit of elongation. The rupture is absolute and permanent. No method yet devised will restore to the unit its former 'elastic' qualities.

"I have brought a number of pieces which have been broken down in our laboratory by repeated compression and release to show you the nature of the change in the rubber. The difference between this rupture and that brought about by stretching, however, is that in the latter the tear usually results in a clean separation, while in the former the rupture may not be noticeable because the broken parts are held in place by others not yet noticeably affected. Nevertheless, the damage is done, and disintegration has commenced—not because the average load exceeded the limit of resistance, but because some one load exceeded it and started the rupture. If I can impress upon you, gentlemen, the great danger of ruining solid tires from once overloading them and the consequent necessity of explaining this matter convincingly to your agents and demonstrating operators as well as the users and prospective users of trucks, I shall feel gratified.

"Tire manufacturers, after years of observation and experiment, have adopted a schedule of carrying capacities which with but slight variations is now considered standard. It seems hardly necessary to repeat the figures at this time for they are given in every tire manufacturer's catalog. Let me say, however, that the factor of safety in the schedule is nil. So many other factors enter into the matter, such as excessive strains due to bumps, depressions in the roadway, negotiating grades, overspeeding and the severe use of brakes, that no provision has been made for overload.

"There are three kinds of overloading to which I should like to call your attention. In doing so I may be in danger of repeating the mistake recently made by Senator LaFollette in his Philadelphia address, namely, accepting the hospitality of an organization and then telling its members how wicked they are. But if I seem to indicate that there are weaknesses in the policy of some truck manufacturers I do not attribute them to selfish motives, but rather to an incomplete knowledge of the economics of the subject.

"The first kind of overloading is due to undersized original tire equipment. I fully realize that the competition in your business makes it necessary for you to economize wherever possible in the equipment of your trucks. You build the best machines that money and skill can devise and you offer them for sale fully guaranteed—except for tires. Without knowing the danger you are running, you may perhaps equip them with the smallest tires that will come within our schedule of carrying capacities. Then, if for any of the reasons I shall mention later, the tires fail to deliver the service expected, the responsibility is at once automatically shifted to our shoulders and we are expected to live up to our reputations for liberally taking care of our product. Suppose your sales agents order just the chassis and then have special bodies built—bodies too heavy in themselves, or so large as to permit the carrying of loads far in excess of those the tires are able to sustain without breaking down. What happens? Your customers soon have trouble with their tires and they complain that the cost of maintenance is more than they had been led to believe.

"The second kind of overloading is due to disproportioned equipment. Sometimes we find that trucks whose tire equipment, regarded as a whole, is ample for the service required, will be lacking in carrying capacity at one end while at the other end there may be an excess capacity over the actual demands. I have in mind a case in which we were called upon to make an adjustment. The proportion of weight carried by each axle showed that the front tires were considerably overloaded while those on the rear had an excess capacity of nearly a ton. The owner of the truck protested his innocence, saying that he had never been told he was misusing his tires. The difficulty once explained, however, and the proper sized front tires applied, there was no further trouble.

"The third kind, which is at once the most prevalent, the most illusive and the hardest to cope with, is due to the improper loading of the commodity upon the truck. Sometimes this may be the result of faulty distribution of the load over the front and rear axles, which may cause the failure of the tires wholly without the knowledge of the owner. This is well illustrated in the following quotation from a paper read by one of our representatives at a conference of truck tire salesmen and adjusters at our factory a few days ago:

"'In the case of a wholesale grocer it was discovered that it was a custom to put all light packages on the front of the truck and save the heavy ones for the rear, with barrels of pork, molasses, sugar and kerosene on the tailboard. In another case the loads of leather board, which were comparatively small and carried but short distances, were all placed at the rear of the truck.

"'In a coal concern the loose load was distributed in the truck body and then the rear was piled up with bags of coal. In each of these cases the total load was within the combined capacity of the tire equipment but not properly distributed.

"'In our judgment improper loading

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must be shared jointly by the maker and his representatives, and by the user. How far the user is to blame varies, and it is a question whether in most cases he is to blame at all.'

"By far the most difficult phase for the tire maker to overcome, however, is the deliberate placing of too heavy loads on the truck as a whole for the tires to carry. The way is paved for the abuse even before your prospect has bought a truck. I refer to the temptation to which some of your salesmen yield to carry heavier and bigger loads than they should when they give demonstrations before a prospective purchaser. When it becomes known that a man is thinking of buying trucks he is besieged by agents asking the privilege of giving demonstrations. A fierce competition then ensues to win the order, by showing how much merchandise may be moved within a given period, and how fast it can be carried. The result is that some of the loads carried in these competitions vary from 50 per cent. to over 100 per cent. over the rated capacity of the tires. I believe that most of these abuses occur without the knowledge and consent of the factories making the trucks, and in certain instances in deliberate disregard of the orders from headquarters.

"One reason for the continuance of this practice is the direct result of the well known policy on the part of many tire makers, of renewing without charge, or perhaps for a nominal charge, such tires as are broken down or worn out on demonstrating trucks for the sake of the advertising value derived from having the tires used. It has always seemed to us that this policy acts as a boomerang to the tire maker, because it is a direct incentive to the ambitious demonstrating salesman to disregard all responsibility for the proper care of the tires in service; no matter how badly they are misused, he doesn't have to foot the bill. And he fails to realize that he is setting a bad example to the man who may be the future owner or driver of one of his trucks. But, in many cases, regardless of the original training and explanations given to a driver, there is always the temptation to fill the truck to the limit of its physical capacity to move the goods. The merchandise must be moved, and 'a load is a load' whether it exceeds the carrying capacity of the tires or not. Unless the tire equipment has an ample margin of safety, however, this attitude results in poor economy.

"The drawing of trailers, while more common abroad than in the United States, is another means of improperly loading tires. No doubt this is an economical means of hauling, but trucks so engaged are placing a greater strain upon their tires, and these should be at least the next size larger than those which would safely carry the truck without a trailer.

"Turning now to the effects of overspeeding on solid tires, I ask you to consider three things. They seem so axiomatic that they need only to be mentioned briefly. First, overspeeding generates excessive heat in the tires, which tends to shorten the life of the rubber. Even though not overloaded, they may be driven so fast that they are 'burnt up,' as it were, in a very short time. Second, it accentuates shocks and jars due to unevenness in the roadway. The stresses thus set up are really the equivalent of sudden overloads, and they tend just as effectively to cause the premature failure of the tires as though they were loaded beyond their capacity. Third, it induces the severe use of brakes, especially in thoroughfares in which there is much traffic. This in turn is apt to cause unnecessary friction with the road surface, which of course wears out the tires promptly.

"I am confining my remarks to the detrimental effects of these abuses upon the tires themselves, although our experience has been that they extend beyond the tires, and are only less injurious to the mechanism of the truck.

"Let us next consider who pays for these abuses. In guaranteeing the truck exclusive of the tires, the truck manufacturer conveniently arranges to 'step out from under.' The burden, therefore, seems to fall upon the truck owner or the tire maker, although I say frankly that the 'ultimate consumer' bears most of the load. When tires fail prematurely the truck owner looks to us for an adjustment. Generally our salesmen have an accurate knowledge of the conditions under which such tires are used, and, if they have been overloaded, we have taken occasion to warn the operator that we cannot be held responsible for failure to deliver normal mileage. Many users seem to feel that because their average loads do not exceed the rated carrying capacities of their tires they have not overloaded them, and consequently the rubber manufacturer should furnish other tires, free, to run out the guaranteed mileage. As there is no gauge by which the loads carried can be recorded, the tire maker has to accept the statement of the truck owner, or run the risk of an unpleasant controversy if he questions it. The truck is laid up—or perhaps merely the tire, if it is of the demountable type—and an adjustment or a paid renewal is made, prematurely. Either method of settlement is more costly than continued service under proper conditions. The truck owner complains that the cost of maintenance is higher than it had been represented to him, although the chances are he had not been impressed with the high cost of overloading.

"You will admit that it is not sound business for a manufacturer to replace an article without due charge, if the user of the commodity has wittingly or unwittingly destroyed it. In self protection, therefore, as well as for the education of the user, we stand our ground, and sometimes we have controversies through which we pay our share. We write letters, we send telegrams, we make personal calls and we send tires by express—all of which are expensive, and might have been avoided. Occasionally these contentions result in the loss of the customer, who decides to use another make of tire. In such cases we feel that we have merely transferred an undesirable account to a competitor, who takes up the burden. Sometimes, however, for the sake of future business under saner conditions, we pay our part of the bill at once as a matter of 'policy.' We make concessions which curtail the profit from the sale of the new tire, but, as most users realize the advantage of renewing with a larger sized tire, the business relations from that time on are upon a much more satisfactory basis.

"But you truck makers also pay, indirectly, because you sell fewer trucks than you might were it not for the unnecessarily high cost of maintenance which these abuses entail.. I venture to say that at this moment your sales departments are all spending time and money trying to overcome the honest conviction on the part of several prospective purchasers that the chief reason for their not buying trucks immediately is, not their unwillingness to make the original investment, but their fear that the cost of up-keep will more than offset the saving to be gained through the use of your trucks. And the chances are that their principal concern is over the cost of tires. This idea has gained undue prevalence because of the unfortunate experience of many operators who have been obliged to pay for destroying their own tires by overloading and over-speeding them, whereas, if they had used tires large enough to perform their work economically, they would be enthusiastic advocates of motor delivery.

"Frankly admitting the existence of these adverse conditions, how can they be improved or corrected? Primarily, by honest co-operation between the truck and tire maker. This very meeting is a good example of the sanest and most effective way to bring about better conditions. Realizing the nature of this problem and the necessity for tackling it vigorously and honestly, the B. F. Goodrich Company is distinctly grateful to be given this opportunity of discussing it with the most prominent American builders of motor trucks. And we shall welcome similar invitations to cooperate with you separately or as a body. We believe that by clearly and convincingly explaining the facts and the true economics of the situation, we can do much toward placing the industry upon a more sound and healthful basis. But we need your help. We need your influence through your written and verbal instructions to your agents, your demonstrators, and your salesmen, to abide by our schedule of carrying capacities, not because we arbitrarily say they must, but because if they do not they are injuring your business as well as ours. We need your help in teaching truck owners and operators that it is more economical to pay for larger original equipment than to buy smaller tires and then, knowingly or

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unknowingly, destroy them prematurely. If we succeed in impressing this fact convincingly upon the purchasers of motor trucks, it will result in our mutual advantage, both in larger sales and a better satisfied clientele."

Valve Wear That May Cause Trouble.

It not infrequently happens that a carburetter that has been properly adjusted will give a bad mixture because of particles of foreign matter having interfered with the action of the auxiliary air valve spring, or lodging on the air valve seat. Sometimes the valve stem, working in a guide, will wear until there is a shoulder, which catches when the valve is opened more than usual, causing an irregular action of the motor.

Why the Crankcase Should Be Drained.

When the big end of the connecting rod is lubricated by means of the splash system, unless some sort of a baffle plate is interposed to prevent the greater part of the oil from reaching the piston, the under side of the piston soon becomes coated with a heavy deposit of carbon. It is essential, therefore, that the oil be drained out of the crankcase at frequent intervals and the case cleaned, for otherwise the carbon which drops, due to the vibration to which it is subjected and to the expansion and contraction of the piston, is ground up into a powder, and owing to its hardness acts as an abrasive.

"Seltzer Water" as a Fire Extinguisher.

A siphon of "seltzer water" makes a very formidable fire extinguisher for a small blaze, for not only can the stream be directed toward the center of the conflagration, but a considerable quantity of carbon dioxide is liberated from the liquid, which tends to smother the flames.



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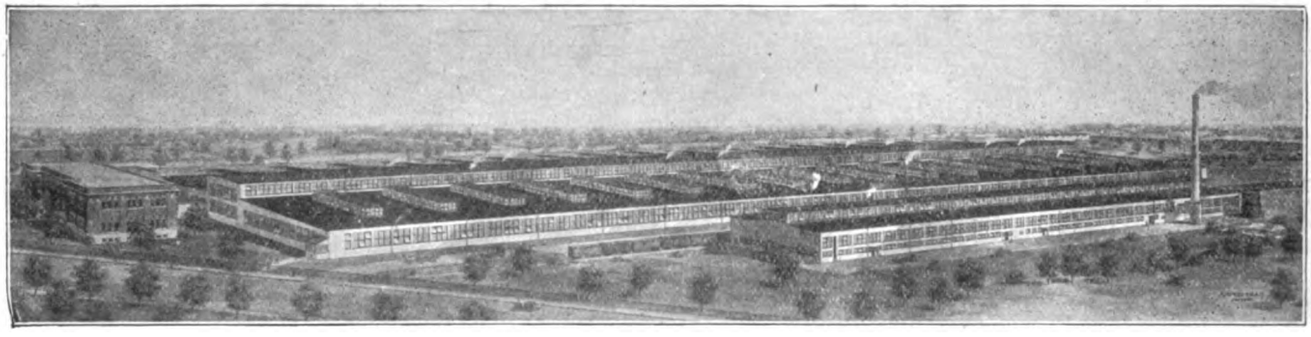
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in the march of progress denote advancement and we who wish to keep abreast the times must certainly keep alive to the ever changing situations Otherwise we may soon be burdened with proverbial

MILLSTONES.

This is particularly true in respect to the purchase of automobiles, and many hundreds of people annually suffer the consequences of ill-advised purchases from firms that engage in re-selling cars that never should have been on the market. The moral is

INVESTIGATE

for yourself very carefully before you buy a car, and especially a second-hand car. It will no doubt interest you to learn what else we have to say on this subject. If so, write E. R. THOMAS MOTOR CAR CO., 1200 Niagara Street, Buffalo, N. Y.

EXTRA FINE Black Japan for enameling automobile lamps, radiators, fenders, etc. Will not crack, chip or peel. One coat covers solid. Air drying or baking. Have your dealer order today. THE COLUMBUS VARNISH CO., Columbus, Ohio.

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MAILING LISTS of automobile owners in Atlanta and several States. 303 Kiser Bldg., Atlanta, Ga.

BARGAIINS in new 4 x 5 4-cylinder auto motors. Equipped. F. E. ALFORD, Goshen, Ind.

FOR SALE—Half interest in an Automobile Garage and Repair Shop in one of the best towns of the Southwest. Best business in the city. A safe investment. Reason for selling—must get out in the open. For further particulars, BOX 202, care Motor World.

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WRITE AT ONCE if you want one or forty five-passenger touring car bodies at $10.00 each. BOX 35, Industrial Bldg., Indianapolis, Ind.

FORD OWNERS, ATTENTION! Equip your car with a Mello-Tone Auto Signal. Special for Ford cars. Sent on 10-day free trial. Price, $5.00. Express prepaid. ELECTRIC CITY MFG. CO., 65 Cherry St., Buffalo, N. Y.

FOR SALE—Model F Stanley steamer, cheap, $300. H. P. BEEBE, Fredonia, N. Y.

MAILING LISTS of Automobile Owners. S. H. CARROLL, JR., Albany, N. Y.

DAY UTILITY REMOVAL NOTICE—Having outgrown our old quarters at 812 Trumbull Ave., after April 1 office, factory and service garage will be located at 25 E. Milwaukee Ave., one-half block from Woodward Ave. Phone N. 881. DAY AUTO CO., Detroit.

FLANDERS 1911 4-passenger, used less than 90 days, $350. COLUMBIA AUTO EXCHANGE, 287 Edgewood Ave., Atlanta, Ga.

A TREMENDOUS SACRIFICE—A professional lady leaving city, indefinite period, will sacrifice Ranier 5-passenger 4-cylinder 30-H. P. touring car; top, folding windshield, high tension magneto, extra shoes, tubes, tools, etc.; $300; warranted perfect running order. MRS. STOUTENBERGER'S CAR, 1075 Intervale Ave., Bronx, two blocks from subway, New York City.

GASOLENE Rumble Seat Runabout; would make exceptionally fine truck; $100; also Cadillac Delivery Car, $100, running order. BINGHAM'S CHAUFFEUR, 1075 Intervale Ave., Bronx, near subway station, New York City.

WANTED—Ardsley touring car; state price and condition. C. H. CURTISS, Naugatuck, Conn.

LOZIER Touring Car, Model 7, 40 horsepower, good condition. JACOB HAGNER, 52 East Court St., Cincinnati, O.

AGENTS WANTED — To handle the $1000 G. J. G. "Junior," racy, classy and specially designed chaseabout with 104-inch wheelbase, with a real 26 H. P. motor, Bosch magneto, Dorian remountable rims with 32 x 3½ tires, at a price of $1,000, which is a money-maker for the sales agent. Write for literature and discounts to G. J. G. MOTOR CAR COMPANY, White Plains, N. Y.

QUALITY RUBBER CEMENT—Best in the World—Hotter the weather the better it sticks. For repairing automobile, motorcycle and bicycle inner tubes and tires. This cement is unequalled. Send 20c. in stamps for two sample tubes. For terms and discounts, write HENRY E. EBY, Fernwood, Del. Co., Pa

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BARGAIN—$750 will buy a nearly new Mitchell 5-passenger automobile. New tires, Bailey tread, top, windshield and all accessories complete. Cost $1,500. As good as new, owing to short length of service. THE TRIUMPH ELECTRIC CO., Cincinnati, O.

GARAGE FOR RENT—Most prominent corner in Bergen section of Jersey City; entrance on two streets; floor space about 170 x 50 on ground floor, 100 x 50 on second floor; brick building with elevator. Apply to owner, T. W. LEAKE, Bergen Ave. and Montgomery St., Jersey City.

BROKEN CRANKSHAFTS, cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

HAVE a buyer for a good 1911 or 1912 auto in perfect shape; he will give his personal mortgage on good property for same at 6%. GEO. B. CLARK, Milford, Conn.

BROKEN CYLINDERS, crankcases, etc., made good as new by welding at about ¼ cost of new parts. No charge unless weld is satisfactory. Write for references and complete information. WATERBURY WELDING CO., Waterbury, Conn.

FOR SALE—5-passenger body, $30.00; top, $15.00; treads, 30 x 3½, $3.50; frame, $6.00; all kinds of repairs for Reo and Rambler cars at from one-half to one-fifth of the list price; also new and second-hand cars for sale. SCHISSEL AUTO CO., Cherokee, Iowa.

EXPERT CHAUFFEUR, motor boat operator and repair man wants work at once. Sober and reliable. Seven years' experience. Address, BENJ. SPRAGUE, 55 High St., Claremont, N. H.

PALM GUM Tire Seal prevents punctures and will keep air from escaping even if punctured by 20-penny nails. Life of tire prolonged. Cost about $10 on average car. Weighs about 20 lbs. Ask your dealer to get it for you. If he won't furnish it we will, at $5.00 per gallon—25% with order. PEORIA AUTO & SUPPLY CO., Sole Distributors, Peoria, Ill.

ELMORE TOURING CAR, 1911, fully equipped, extra tires, warranted fine condition, like new, great roadster, price $750, act quick, send for full description. H. J. DANIELS, Norwich, N. Y.

SCORED CYLINDERS repaired, $12 each. No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. Better investigate and save money. References, testimonials, and full details on request. WATERBURY WELDING CO., Waterbury, Conn.

ACETYLENE SELF-STARTER, $12.50—Fully guaranteed, easily installed on any car with dual ignition in two hours. Money back if not satisfied. Booklet free. THE MOORE & BOWES CO., Battle Creek, Mich.

AUTOMOBILE SPECIALTIES—Models and experimental work, electrical and mechanical, special auto parts, bearings, etc. AUGUST HORMEL, 587 Hudson St., New York City. Tel. 2873 Chelsea.

SALESMEN, one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. STURDY MFG. CO., 2637 Michigan Ave., Chicago, Ill.

LOCOMOBILE—Forty horsepower. Special bargain for anyone wanting a first-class high grade automobile. In first-class condition. Full equipment including fore door torpedo body, nickel trimmings, top, Warner Odometer, Prest-O-Lite, Klaxon, shock absorbers, seat covers, Kellogg air pump, tire trunk, Rushmore headlights, combination electric and oil lamps. 100 Wright St., Newark, N. J.

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1,004,635. Starting Device. Wilber R. Dunkel, Pana, Ill., assignor of one-half to Carter R. Scoggin, Harristown, Ill. Filed Dec. 12, 1910. Serial No. 596,863.

1. In a starting device for gas engines, the combination with a ratchet wheel fixed on the engine shaft and having conical ends; of a drum comprising a cup-shaped body having in its bottom a hole for said shaft and a bearing face adapted to rest on one of said ends, and a plate threaded into the mouth of the cup and having a central hole for said shaft and a bearing face adapted to rest on the other of said ends, the plate having a series of perforations through it, a lug cast within the rim of the body and having a threaded hole, a screw passing through the bottom of said body and screwing through said hole and having a reduced tip engaging one of the perforations in said plate to hold the latter in adjusted position, a pawl pivoted on the body of the screw with its tip directed toward said teeth, a spring pressing the tip toward the teeth, manipulating means for directing the rotation of the drum in one direction, and retracting means for normally rotating it in the other direction.

1,004,636. Starting Device. Wilber R. Dunkel, Pana, Ill., assignor of one-half to Carter R. Scroggin, Harristown, Ill. Filed Dec. 12, 1910. Serial No. 596,864.

1. In a starting device for gas engines, the combination with a housing extending across the main shaft, a bar slidable within said housing and having teeth on its lower edge at its central portion but omitted at its end portions, a toothed wheel on the main shaft of the engine with which said teeth on the bar are adapted to engage, a retracting device at the inner end of the housing connected with the inner end of the bar, and manipulating means connected with the outer end of the bar and leading to within reach of the operator; of means for permitting the teeth on the rack bar to engage those on the wheel when the former is drawn forward and for mechanically disconnecting them when said bar is retracted.

1,004,642. Rubber Tire. George H. Gillette, New York, N. Y. Filed Nov. 28, 1910. Serial No. 594,517.

1. A rubber tire comprising a plurality of sections of resilient material, and an externally mounted retaining ring, said tire having a greater number of said sections than normally required to form a continuous circle of the diameter of said retaining ring whereby the said sections are held in place in a compressed condition.

1,004,667. Vehicle Wheel. Louis B. Lodge, Cuyahoga Falls, Ohio. Filed Sept. 3, 1909. Serial No. 516,016.

A vehicle wheel comprising a hub; spokes attached at their inner ends to the hub and arranged radially, which spokes are tubular from their outer extremities a suitable distance inwardly; a rim extending circumferentially of the wheel at the outer ends of and attached to the spokes, which rim is concentric relative to the hub; a tire; a tire holder extending circumferentially of and concentric relative to the rim and shiftable vertically in a plane arranged at a right angle to the axis of the wheel, said tire holder having an interior chamber extending circumferentially of the tire holder, which chamber has its inner circumferentially extending wall provided adjacent each spoke with a bolt-hole which is elongated circumferentially of the tire holder; a bolt having its shank arranged within and longitudinally of the tubular portion of each spoke and extending through the adjacent bolt hole in the tire holder, which bolt has its head overlapping the inner surface of the inner circumferentially extending wall of the aforesaid chamber between the said bolthole and the side walls of the chamber, and a spiral spring mounted and confined on the said shank and acting to retain the tire holder concentric relative to the wheel rim.

1,004,695. Automobile Tire. Charles E. Scheuring, West De Pere, Wis. Filed Mar. 10, 1911. Serial No. 613,488.

1. In a device of the class described, a felly; a tread plate; parallel superposed, reversely curved inner and outer springs disposed circumferentially of the wheel, the ends of the outer springs being disposed adjacent the tread plate, and the ends of the inner springs being disposed adjacent the felly; fixed members upon the tread plate constituting an abutment for the adjacent ends of adjoining pairs of outer springs; and fixed members upon the felly constituting an abutment for the adjacent ends of adjoining pairs of inner springs.

1,004,696. Internal Combustion Engine. Ralph Schoeck, Oerlikon, Switzerland, assignor to Schweizerische Werkzeugmaschinenfabrik Oerlikon, Oerlikon, Switzerland. Filed Apr. 12, 1911. Serial No. 620,650.

1. In a rotary combustion engine, the combination with a cylinder having an exhaust port, an inlet for combustible, and an air inlet port all located proximate the periphery of the cylinder and an air inlet, and a delivery passage proximate the center of the cylinder; of a drum mounted to rotate within the cylinder eccentrically, and pistons passing through the drum to the cylinder wall moving with said drum, and forming walls of combustion chambers between the cylinder and drum, and walls of compressor or pump chambers within the drum, the combustion chambers co-operating with said ports and inlet proximite the periphery of ht ecylinder and the pump chambers with said passages proximate the center of the drum.

1,004,703. Vehicle Wheel. Lonnie C. Smoot, Hillsboro, Tex. Filed July 15, 1910. Serial No. 572,124.

1. A mechanism consisting of a plurality of radial rods, means being provided to guide each rod under radial displacement, a coiled spring mounted upon each rod, the outer extremities of which will move with the rod, while the inner extremities remain stationary, the outer extremities of each rod being connected by a pair of links with the inner extremities of the two adjacent rods.

1,004,720. Internal Combustion Engine. William Morten Appleton, Weston-super-Mare, England. Filed Apr. 15, 1911. Serial No. 621,264.

1. In an internal combustion engine of the two-cycle type, the combination of three pairs of cylinders one of each pair being a power cylinder and the other a displacer cylinder, compound pistons working in said cylinders, an inlet port in each power cylinder, a gas by-port in each power cylinder, a passage in each power piston adapted to put the inlet and gas by-port into communication during a predetermined part of the stroke of said piston, a by-pass port in each power cylinder for admitting the gas from the displacer cylinder, an exhaust port in each power cylinder, a distribution port in each displacer cylinder, and distribution passages each connecting the gas by-port of the power cylinder of one pair, the by-pass port of the power cylinder of another pair, and the distribution port of the displacer cylinders, the arrangement of said ports and passages being such that in action the displacer cylinder of each pair draws its gas through the piston of the power cylinder of one of the other pairs and delivers it into the power cylinder of the third pair.

1,004,733. Automobile Brake. William Besler, Colma Station, Wis. Filed Feb. 18, 1910. Serial No. 544,698.

1. In a vehicle brake, the combination of a shoe adapted for engagement with the ground, a swinging leg pendent from the vehicle and having the shoe pivotally connected to the lower end thereof, the said leg being normally swung upwardly and forwardly to hold the shoe in an inoperative position, a forwardly extending brace rod pivotally connected at its extremities to the shoe and some stationary part of the vehicle, the said brace rod being longitudinally extensible and being formed in sections which are yieldably connected, the rear end of the brace rod being hinged so as to fold back upon itself when the leg is swung upwardly to hold the shoe in inoperative position, and means for normally holding the shoe in inoperative position.

1,004,738. Ball Bearing. Fred Eugene Bright, Philadelphia, Pa., assignor to The Hess-Bright Manufacturing Company, Philadelphia, Pa., a Corporation of Delaware. Filed June 1, 1906. Serial No. 319,782.

1. In a ball bearing comprising two bearing rings having races of curved cross section and balls in the races, a homogeneous anti-friction metal separator interposed between two adjacent balls, the separator extending somewhat into the ball races.

1,004,739. Process of Assembling Ball-Bearings. Fred Eugene Bright, Philadelphia, Pa., assignor to The Hess-Bright Manufacturing Company, Philadelphia, Pa., a Corporation of Delaware. Filed Oct. 15, 1909. Serial No. 522,824.

1. The process of assembling a ball bearing comprising bearing rings, balls and separators, the latter being each composed of malleable metal capable of easy deformation and of solid cross-section, consisting in originally forming the separators so that they may be readily inserted between the rings, inserting the separators in working position between the balls, and thereafter changing the form of the separators so that they are prevented from displacement from working position.

1,004,816. Automobile Fire Engine. John Livingston Poultney, Haverford, Pa., assignor to James Boyd & Brother, Inc., Philadelphia, Pa., a Corporation of Pennsylvania. Filed June 24, 1910. Serial No. 568,651.

In an automobile fire engine the combination of a shaft, a change speed mechanism for driving the shaft at different speeds, the differential-and-brake sleeve driven by said shaft at different speeds, a wheel-driving gear driven by said shaft, a pump, means interposed between the pump and sleeve for driving the pump, and devices for connecting and disconnecting said shaft and

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wheel-driving-gear and said sleeve and pump, substantially as described.

1,004,819. Vehicle Wheel. Ernest Louis Reguin, San Francisco, Cal. Filed May 11, 1910. Serial No. 560,596.

1. In a vehicle wheel, the combination with a hub, of inner and outer separated rims, spokes on the hub sppporting the inner rim, said spokes being recessed on one side from their outer ends to a point terminating short of the hub, said inner rim comprising a channel ring divided circumferentially into two sections, one of which sections is in the form of a removable flanged ring substantially Z-shape in cross section, and having one of its flanges fitting the recessed portions of the spokes, and the other section of said channel ring being integral with the spokes, the outer rim formng a complementary channel of larger diameter than, and slidably embracing the inner channel ring, and having a removable member on the same side of the wheel as the removable flanged ring of the inner rim, and overlapping said ring, and an inflatable tube housed between said channels.

1,004,820. Vulcanizing Apparatus. Benjamin P. Remy and Frank I. Remy, Anderson, Ind., assignors to the Remy Electric Company, Anderson, Ohio, a Corporation. Filed Apr. 29, 1909. Serial No. 492,853.

A vulcanizing mold having a plurality of mold members arranged with reference to each other to form a rubber chamber from which the rubber cannot escape during vulcanization and so that the compressing movement of said members will not be limited excepting by the rubber, rods extending through all of said mold members, and springs on said rods acting against said mold members for compressing the same.

1,004,833. Combined Muffler Cut-out Valve, Whistle, and Safety Alarm Valve. Henry Grady Weaver, Eatonton, Ga. Filed Aug. 20, 1910. Serial No. 578,131.

1. In apparatus of the class described, the combination of a valve casing having a discharge opening provided with an inwardly contracting portion forming a valve seat, said valve casing being also provided with an outlet opening for connection with the exhaust pipe of an internal combustion motor, a rod mounted for vertical movement in, and through the casing, a valve on the said rod, a spring acting on said rod to normally close said valve against the said valve seat, and a whistle bell disposed exteriorly of the said valve casing, attached to the said rod, at a point spaced from the valve, and movable with said rod, and said valve.

1,004,887. Automobile Gun Mount. Samuel N. McClean, Cleveland, Ohio, assignor, by mesne assignments, to The Automatic Arms Company. Filed Nov. 10, 1906. Serial No. 342,864.

1. In a vehicle in which the body is supported from an axle by interposed resilient means, interlocking means carried by the body and axle normally held out of engagement by the resilient means, and means carried by the body for compressing said resilient means to bring said interlocking means into engagement.

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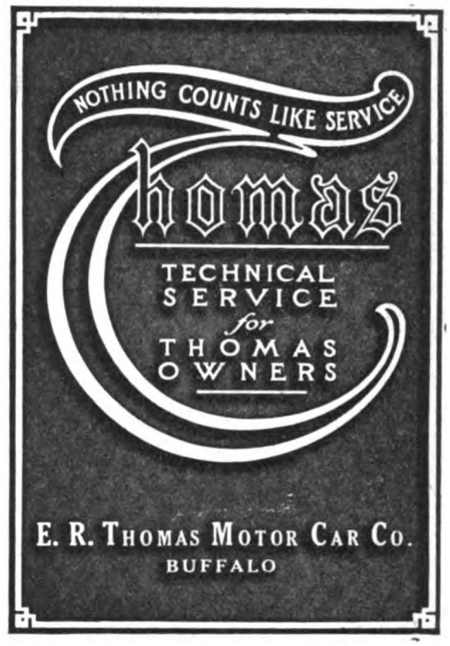


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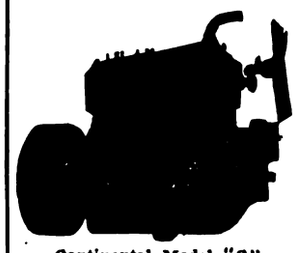
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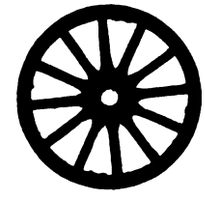


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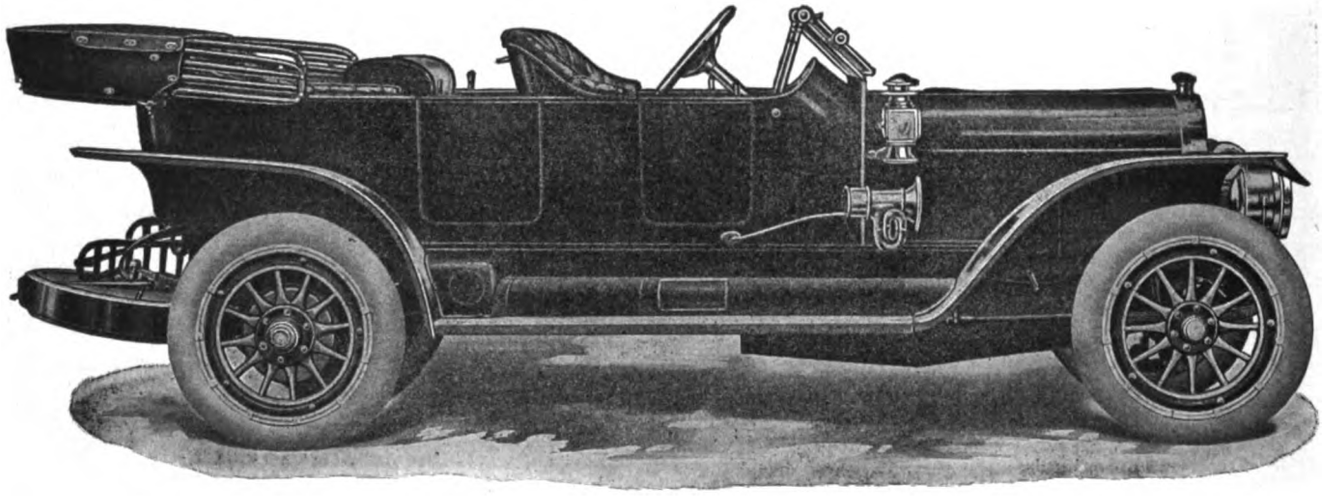
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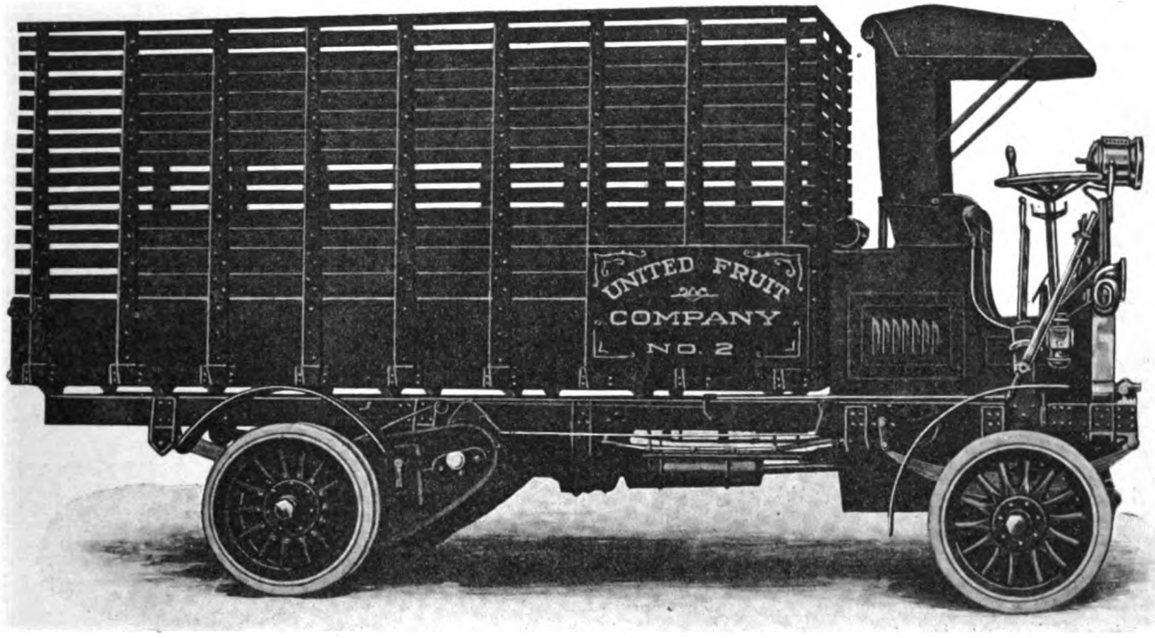
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have been recognized as the highest standard of motor truck design and construction ever since the beginning of the industry.



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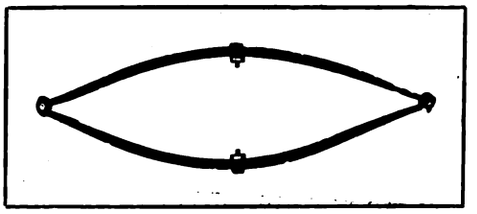
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We modify our designs to meet detail requirements, or build to approved designs on seasons **quantity specifications.**

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Warner Gear Co.
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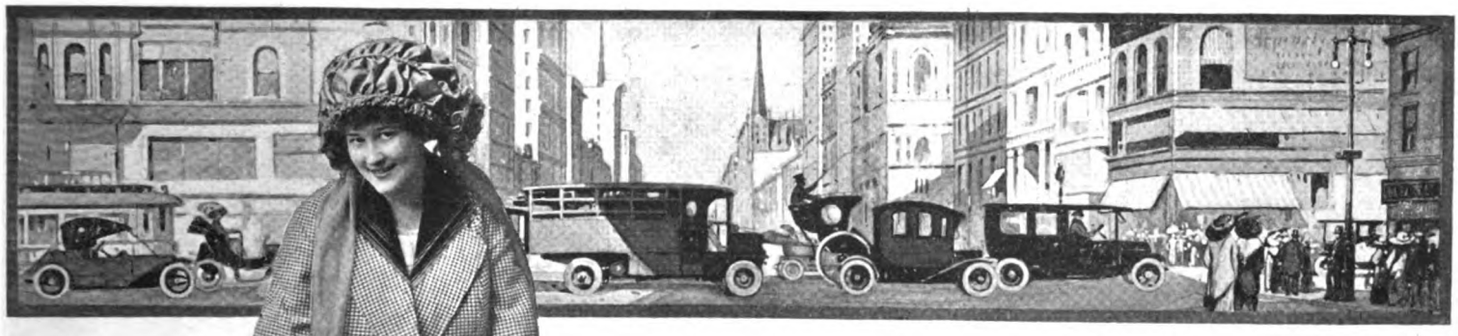
offers a market place for dealers and manufacturers who have something to sell or something to buy—more particularly among themselves. This market place is found in the

Classified Advertising Section

a department consulted and used by a large proportion of the trade. Look it over on page 49, and then look over your dead stock and if you have anything to buy, sell, or exchange, send us the advertisement—we'll do the rest.

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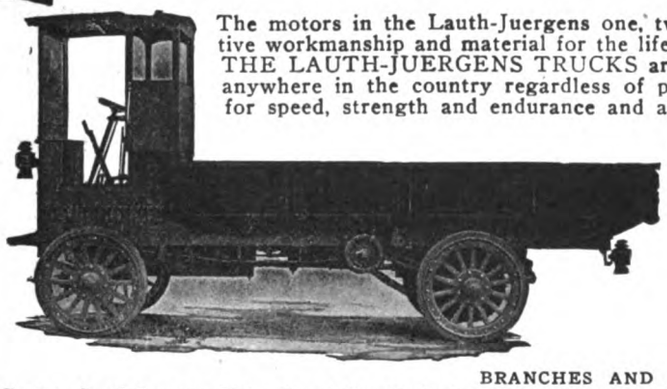
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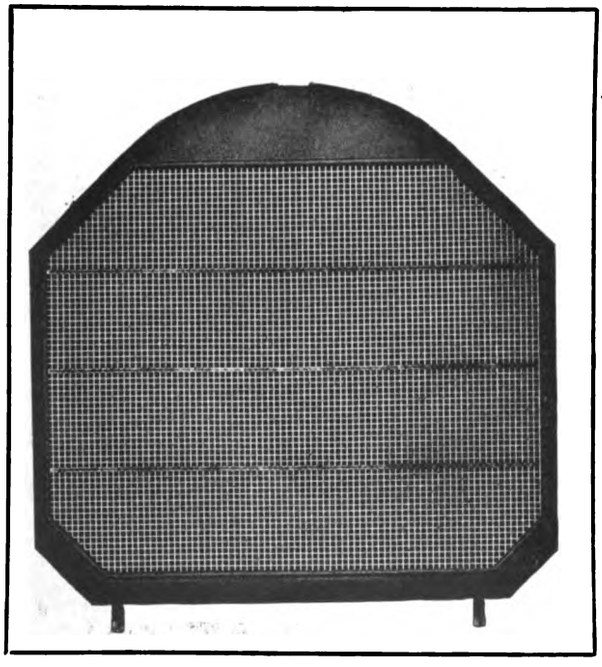
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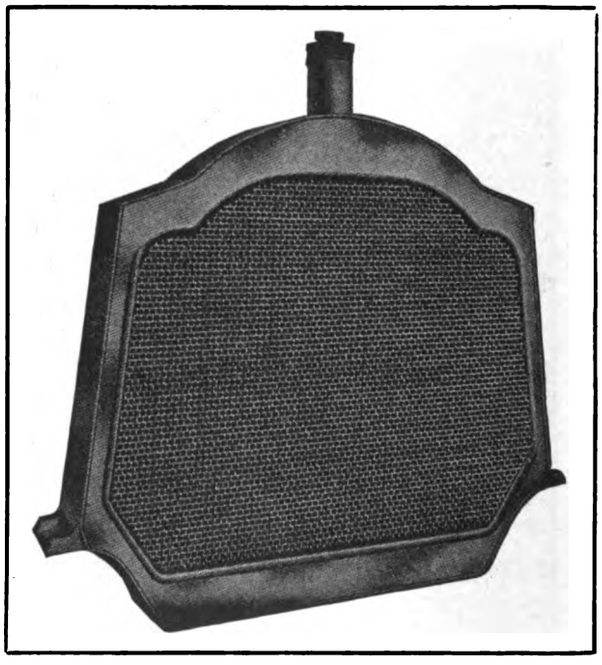
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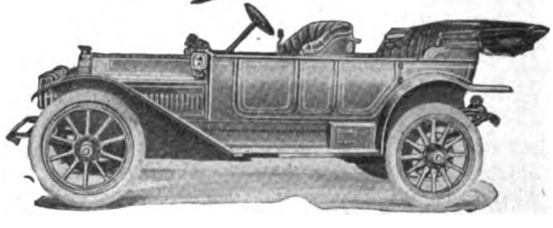
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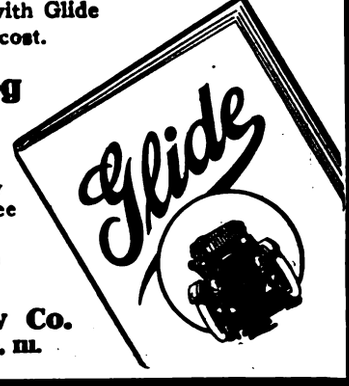
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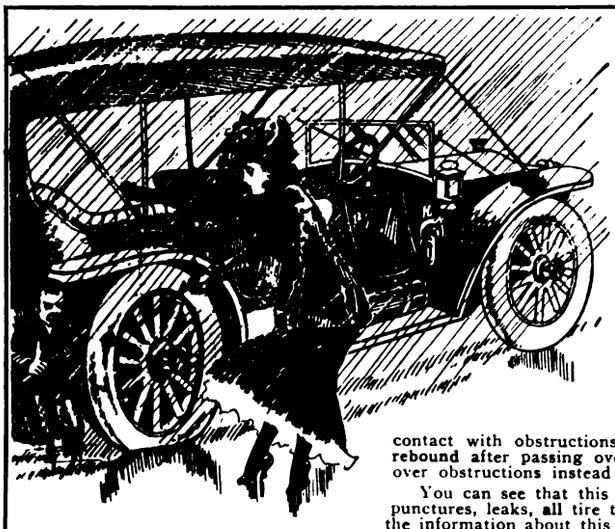
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Now, resiliency is no longer dependent on inflation. A few years more—and inner tubes, pumps and tire troubles will be things of the past for every motorist. The question that concerns you is—Will you be one of the fortunate first or one of the money-drained last to get free of tire troubles?

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So write us today for the free book—"The Air-Free—Care-Free Tire." It answers your every question.



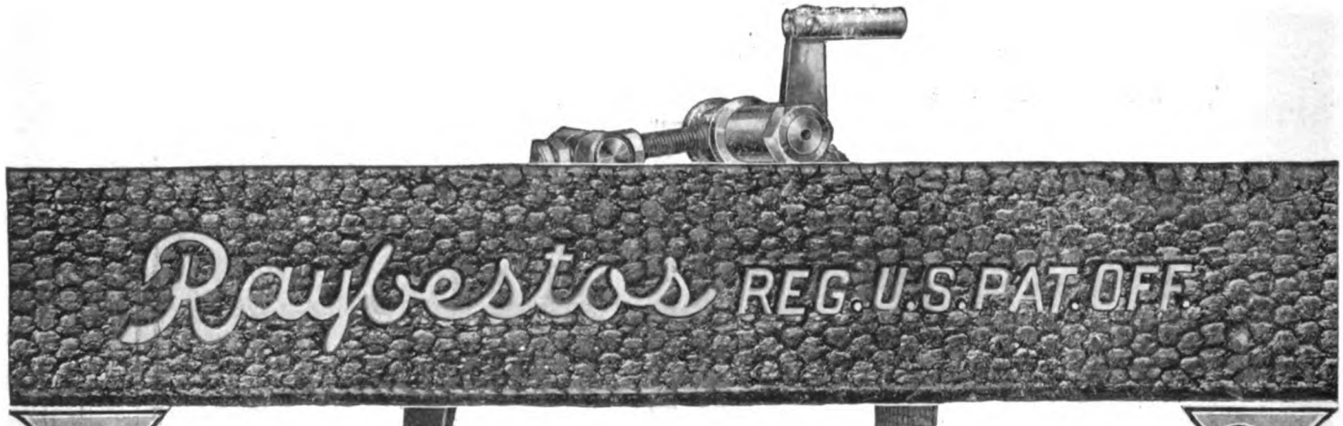
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The Best Friction Facing

Made of highest grade of Asbestos woven with copper wire.

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(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

Diamond Tires

We could build them cheaper But We Won't

We would build them better But We Can't

THERE are two good reasons for your handling Diamond Tires rather than any other—

¶ You'll do a bigger tire business and do it with less effort,

¶ And you'll do a bigger business in all other lines you handle.

¶ Everybody knows that Diamond Tires set the tire standard in America—

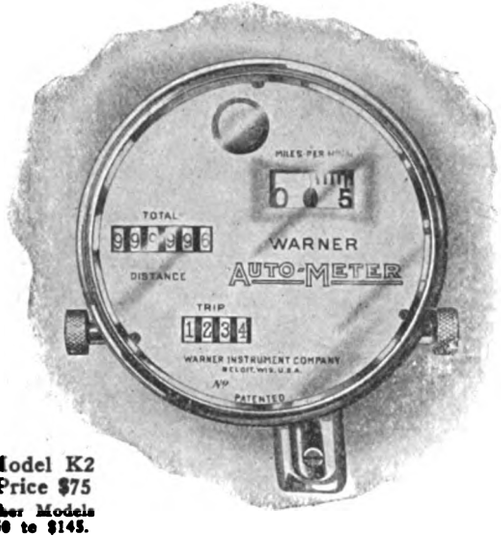
¶ And everybody will believe that a dealer who handles Diamond Tires handles quality supplies straight through.

¶ That's a reputation worth getting—and you will get it if you let Diamond prestige work for you.

We publish a magazine for dealers. It's worth getting. Send in your name. We want you to have it.

The Diamond Rubber Company
Akron, Ohio

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Model K2
Price $75
Other Models
$50 to $145.

WARNER
AUTO-METER

"The Aristocrat of Speed Indicators"

THOSE in other cars and who pass an Auto at the curb, say, "That must be a good car. See! It has a Warner on the dash!" The Warner is the Hall Mark of Quality on an Auto.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

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Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
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TIRES

(Guaranteed 5000 Miles)

Strong Selling Talks for Ajax Dealers

The real test of a tire is in long, rough road usage, as most motorists are tourists and not track racers. In recent years Ajax Tires have been the winning tire equipment in more reliability and touring contests than any other make of tire.

This is the highest possible recommendation a dealer can give a tire because it means that such a tire is exactly suited to the usage of his average customer. Ajax Dealers find that it is a sales-clinching point.

Ajax Dealers are entitled to the cream of the trade and they get it! Write for Ajax Dealer inducements.

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General Offices: 1796 Broadway, New York
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YOU CAN WALK FROM THERE TO ANYWHERE

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We now have 360 rooms with 265 baths.

Write us for descriptive folder with typical floor plan and rate card.

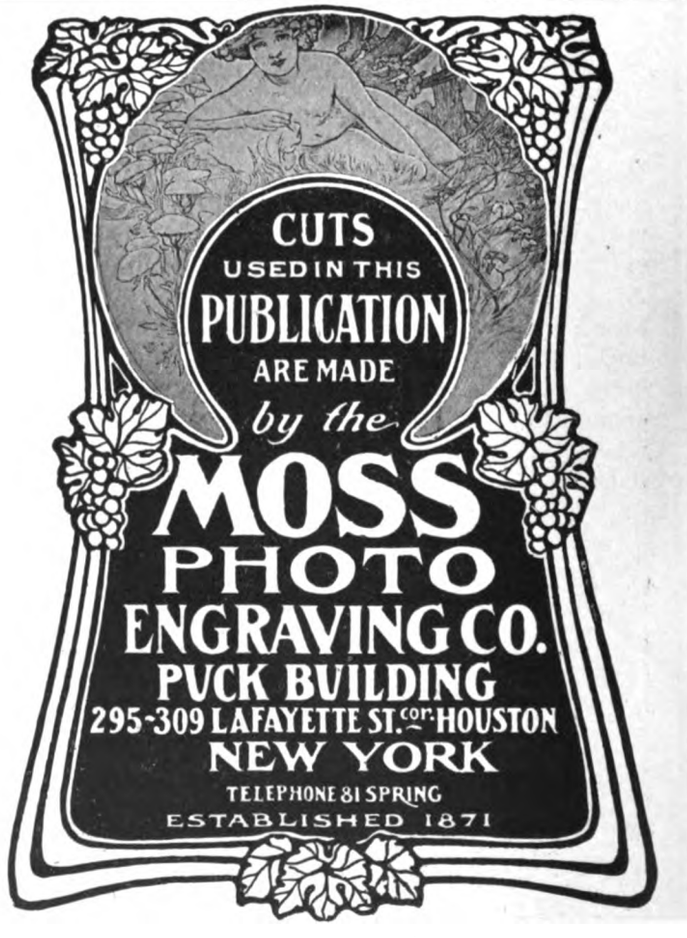
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RATES:

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Also "THE BERWICK," Rutland, Vermont



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By Actual Test

(Patented)

The Sparks-Withington One-Piece-Blade RADIATOR FAN will deliver a greater volume of air with less horsepower consumption than any other fan on the market. Bonafide tests furnished to those interested.

With this assurance, and considering that we are specialists in fan construction where you are not, we desire the opportunity only to prove our claims, and, therefore, request your blue prints or a sample fan for estimate. Out of ten standards no doubt we can give you something without making special tools. That would mean a saving to you.

We will gladly test free of charge and submit report on fans you now employ.

Don't fail to write us when you are ready to consider 1912 contract.

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Battery Boxes — Hubs Complete
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The Best Oil for All Motors

When a car starts out lively in the morning and then shows signs of sluggishness later in the day, it usually means something is wrong with the lubrication.

Use **POLARINE** Oil and you will avoid two-thirds of all motor troubles.

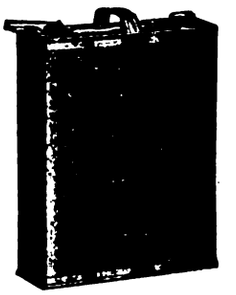
POLARINE is the best automobile oil yet produced.

It gives the maximum lubrication for the amount used. It insures the least possible friction and wear, with full compression and power.

It leaves no carbon deposit.

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Look for the flat, convenient can —just fits in the tool-box. Ask your dealer.



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Standard Oil Company
(Incorporated)



YOU DO

want a smooth-running motor, don't you?

Equip your motor with a set of "AC STAR" spark plugs and you will be able to run at top speed and throttle down with no danger of back-firing, as the superior design of "AC STAR" plugs prevents pre-ignition.

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CHAMPION IGNITION COMPANY

FLINT, MICHIGAN

REMY



Inductor

This is the laminated fan-tail inductor. Thin sections of special lamination steel (insulated to prevent eddy currents and electrical loss) are pressed into one solid indestructible unit. It is keyed to the steel inductor shaft with Woodruff key. One inductor revolves on each side of the stationary winding, generating electrical impulses in the winding.

Can not wear or get out of true. The sturdiness of the inductor is characteristic of the entire magneto—the keynote of unfailing Remy Ignition Service.

Remy Electric Company.

Factories—ANDERSON, IND.—Gen'l Office
Service Stations in Every Important City

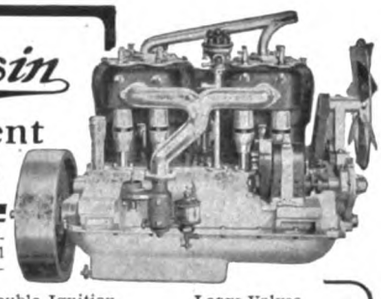
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¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

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The Consistent Motors



Real masterpieces of engineering skill. Note their special features — examine their perfect construction.

Large Bearings — Double Ignition — Large Valves
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Ample Water Jacket — Long Stroke

ALL 4 CYCLE — IN 5 TYPES — 3 3-4 In. bore, 5 in. stroke, 4 cyl. 4 1-4 In. bore, 5 In. stroke, 4 cyl.
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Write us and we will tell you where a Wisconsin Motor may be seen.

WISCONSIN MOTOR MANUFACTURING COMPANY, Dept. 32, Milwaukee, Wisconsin

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R-C-H "Twenty-Five"

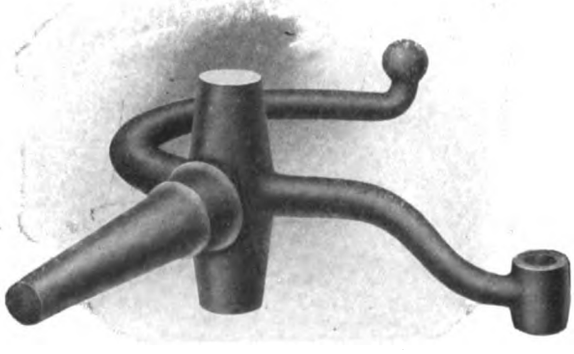
Five Passenger Touring Car

Model SS $950 Self-starter and other special equipment.

Standard Model $850 Fully equipped, but without self-starter and other special equipment.

HUPP-YEATS ELECTRIC COACH
"The first advance in coach-making in over a century."
Six models — $1750 to 5000
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R-C-H CORPORATION 104 Lycaste St. DETROIT, MICH.



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in making and treating
Drop Hammer Forgings

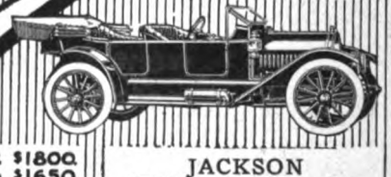
We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

Jackson
No hill too steep
No sand too deep



MODEL 52 $1800.
" 45 $1650.
" 32 $1100.
" 26 $1100.
" 28 $1000.

JACKSON AUTOMOBILE CO.
1204 E. Main Street
JACKSON, MICHIGAN

Hupmobile

Long-Stroke "32" Touring Car $900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

20 H. P. Models

Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100
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HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

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COVERT Transmissions

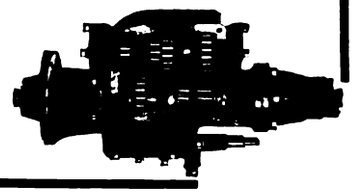
have been approved by leading engineers as the very best for hard exacting service.

If you want to make your car immune to transmission troubles, you should send for complete information regarding the Covert line.

COVERT MOTOR VEHICLE COMPANY

Sales Offices:
Ford Building, Detroit, Mich.

Factory: Lockport, N. Y.



Ford

The Car of Vanadium Steel

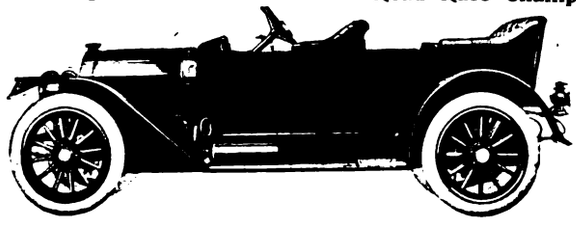
The car which has won deserved popularity by reason of established merit.

Send for catalog and other descriptive literature.

FORD MOTOR COMPANY
Detroit, Mich., U. S. A.

National 40

Stock Champion Road Race Champion



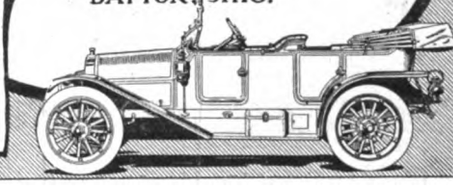
Five Passenger Touring Car, Series V, $2,900
NATIONAL MOTOR VEHICLE COMPANY
1007 E. 22nd Street Indianapolis, Ind.

Speedwell

A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.
DAYTON, OHIO.

TORPEDO
4-Passenger
$2,700
Fully Equipped including Self-Starter

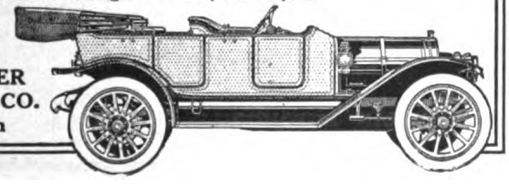


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See our free Table of Comparative Motor Car Values — It will make you a posted purchaser and enable you to form an estimate in your selection of a car that is conservatively the most for the money. **Cutting cars cost less per Horsepower and per Wheel Base Inch than any other automobile selling for $1200 or more.** In point of design, workmanship and finish they are equal, and in some cases superior, to cars selling for from $3000 to $4000.

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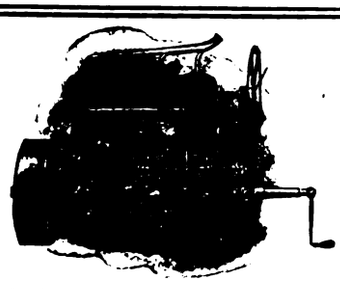
CLARKE-CARTER AUTOMOBILE CO.
Jackson, Michigan

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY
222 N. George Street YORK, PA.



No road too rough, no hill too steep for the car that carries

THE RUTENBER MOTOR

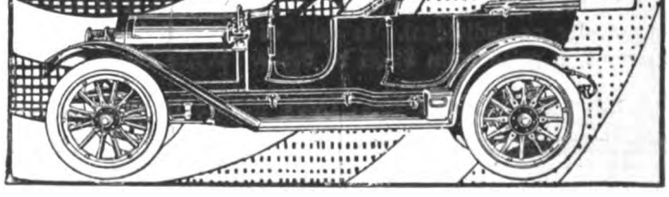
It has made more reputations and broken more records than any other motor.

THE WESTERN MOTOR COMPANY, Marion, Ind.

COLE

Ward Leonard Dynamo Electric Lighting System; Self Starter; Unit power plant; 4½" x 5½" motor, enclosed valves; Bosch ignition; Timken axle equipment; 35 x 4 in. wheels; demountable rims; 122-in. wheelbase; nickel trimmings; Seven bodies: $1885.

HENDERSON MOTOR SALES CO., General Sales Agents
COLE MOTOR CAR CO., Indianapolis, Ind.



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Marion

The Dealer's Cue for 1912



Our Advance Catalog Tells Everything

MARION "35" Five Passenger Touring Car..... $1285
Marion "33" Roadster..... 1150
Marion "46," "47," "48"—two, four and five passenger..... 1750

THE MARION SALES CO., Indianapolis, Indiana

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First in the World

The first company in the world to make Sixes exclusively was the Winton Co. The result is that the Winton Co. has a longer specialized experience in Sixes than any other maker, here or abroad. That's why the Winton Six is ahead of them all. Our saying so doesn't make it so; we say it because it is so.

Shall we send our catalog?

THE WINTON MOTOR CAR. CO.
426 Berea Road Cleveland, O.

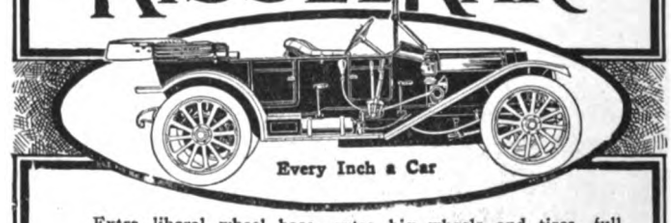
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THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta Minneapolis and San Francisco

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Every Inch a Car

Extra liberal wheel base, extra big wheels and tires, full equipment, demountable rims, 4 speed transmission, 30, 40, 50 H. P., 4 cyl. models, $1,500, $1,850, $2,350; 6 cyl., 60 H. P., $3,000. Full line of trucks and delivery wagons. Write for 1912 portfolio. *Branches and Agencies everywhere*

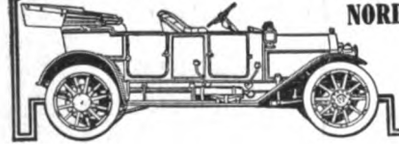
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The Easiest Riding Car in the World

MARMON

INTERNATIONAL CHAMPION

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

Franklin Model D

6 Cylinders 38 Horse Power

A large six-cylinder car of low tire cost. Tire service averages from 8,000 to 10,000 miles per set.

Made in two body styles—a five passenger touring car and a four passenger torpedo-phaeton, the most distinctive type of motor car built.

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The American Underslung

WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

American Motors Co., Dept. E, Indianapolis, Ind.

Abbott-Detroit 1912 MODELS

MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats..... $1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield 1775
Fore-door Limousine, fully equipped..... 3000

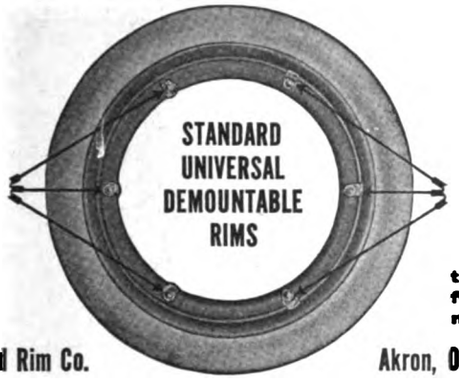
MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield $1350
Fore-door Roadster, fully equipped, less top and windshield 1275
Colonial Coupe, fully equipped..... 2150

ABBOTT MOTOR COMPANY
607 Waterloo Street Detroit, Michigan

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Two Turns UNLOCKS the Rim for De-mounting

The United Rim Co. Akron, Ohio

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$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

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U. S. AUTO HORN CO.

AUTOMOBILE HORNS MOTORCYCLE

REED, BULBS AND FLEXIBLE TUBING

For sale by leading jobbers everywhere

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No Cranking! No Pumping!

START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

American Starter & Carburetor Mfg. Co.

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AND AVOID THEFT

Take advantage of this special offer, which lasts for 30 days: Upon receipt of cash with order we will make your stamp for 10 cents per letter. Send us your order now.

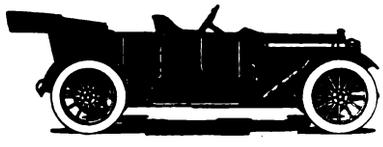
THE SACKMANN MFG. COMPANY

88-90 Canal Street AKRON, OHIO

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Empire Tires
WEAR LONGEST
EMPIRE TIRE CO., Trenton, N.J.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

MICHIGAN BUGGY COMPANY, 188 Lay Blvd., Kalamazoo, Mich.

The Kinsey Manufacturing Company
TOLEDO, OHIO

Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

K · D
The Motor With the Sliding Crescent Valve

KNIGHT-DAVIDSON
1896 — 1912

The **CRESCENT** valve of the **K-D Motor**, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The **K-D motor** is **simple, silent, cools rapidly**, has the **simplest** oiling system known, will not **carbonize**. Last and most important, will give on a given quantity of fuel more **power, speed and endurance**, unit for unit, than any other engine on any type of an automobile. We want to present some **facts** to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

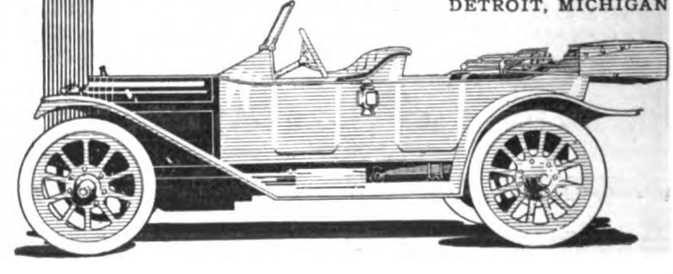
KING

The dealer who sells the King "36" can offer exclusive features not found on any other car at any price.

With Full Equipment, Including Self-Starter, **$1565**

Terms, territory and detailed description on request

KING MOTOR CAR CO., 1314 Jefferson Ave., DETROIT, MICHIGAN



B & L CASTER FRONT AXLE
Makes a Big Winner in Philadelphia
Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager,
1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

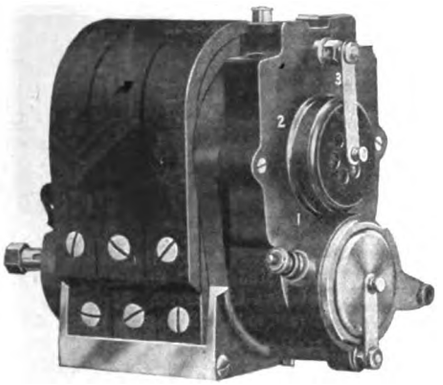
Philadelphia, Pa., 1418 Blavis St.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

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$30.00
For this $105.00
6-Cylinder
U. & H. Magneto



Third Annual Magneto Bargain Sale

Imported High Tension Magnetos at Less Than Cost of Importation

Our third annual genuine inventory sale of U. & H. Master Magnetos, made in Germany, is now in progress. All H. P. sizes and types for 1, 2, 4 and 6 cylinder motors, suitable for motor cars, motor wagons, motor boats, motorcycles, stationary engines, etc. Write now, before they are all gone, for circular and price list. The sale is a real Magneto money-saver.

J. S. BRETZ CO., 250 West 54th Street, New York

One Million
BOSCH
Magnetos

THE production of Bosch Magnetos has passed the million mark, a point no other has approached even by half. It is a basis of confidence, A REASON WHY you should be careful to specify "Bosch" and accept no other.

What Is Good for a Million Is Good Enough for You.

BOSCH MAGNETO COMPANY
223-225 West 46th Street NEW YORK
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"Firestone"
TIRES
Most Miles Per Dollar

THE FIRESTONE TIRE & RUBBER CO.
America's Largest Exclusive Tire and Rim Makers" Akron, Ohio



Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.
CARTERCAR COMPANY, Pontiac, Michigan

Mais Motor Trucks
Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

Dealers Will Receive Personal Attention

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ANNOUNCEMENT

Pleasure Cars	-	7 Models	$850 to $3500
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Now Closing 1912 Contracts

PETREL MOTOR CAR COMPANY
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"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500

(Completely Equipped)

The Fiat Agency Policy Is One of Permanency

POUGHKEEPSIE **F.I.A.T.** NEW YORK

The Electric Car of Quality

THE COLONIAL

Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

COLONIAL ELECTRIC CAR COMPANY

Detroit, Michigan-

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS SIX — HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

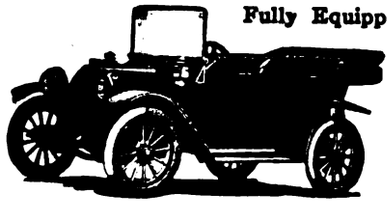
Full specifications sent on request.

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

BRIGGS-DETROITER CO., 449 Holbrook Ave. Detroit, Mich.

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The Only Complete Car

Electrically Self Started and Lighted

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Six Models 40 & 50 H.P. Fully Equipped

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Model 32-B—A 40 H. P. Roadster at - - - - - $1700

All fully described in our Art Catalog. Send for one today.

Inter-State Automobile Co., Dept. O Muncie, Ind.

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It's Great

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McINTYRE AGENT

Established, able dealers are invited to write for information as to open territory. Both pleasure and commercial cars.

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Motor Car Manufacturers Since

1893

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Occupying the newest and most modern automobile manufacturing plant in America.

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SHAWMUT TIRES

SOLD EVERYWHERE **SHAWMUT TIRE CO., Boston, Mass.**

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Argo Electric Brougham
Argo Electric Wagon

Two splendid propositions for live agents. Write for catalog and investigate.

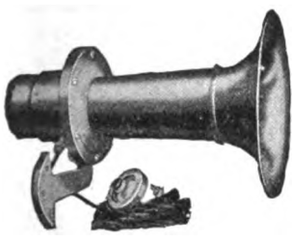
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Saginaw, Mich.

THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster, price $1,750; five-passenger Century Brougham, price $1,950. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
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Put a
NEWTONE
On Your Car
Price $20 Complete with Button and Cable
The Best Warning Signal on the Market
"The Mile Away Motor Horn"
Insures
EFFICIENCY and ECONOMY
Let Us Send You One on Approval
AUTOMOBILE SUPPLY MANUFACTURING COMPANY
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Sheet Metal Stamping

WE HAVE an exceptionally complete equipment for the manufacture of special shapes from sheet metal including heavy and difficult cold drawing and forming work of Automobile and Motor Truck Parts, such as Step Hangers, Brake Drums, Axle Housings, Torque Arms, Hood Supports, etc. Send us your blue prints. Estimates cheerfully furnished.

THE BOSSERT CO., Utica, N. Y.



Some automobile owners are always cleaning their spark plugs—others who use Reliance Plugs don't have to.

The Reliance book, "Ignition and Spark Plug Talk," tells why. Supposing you write today and get a copy.

JEFFERY DEWITT CO.
65 Butler Avenue Detroit, Mich.
Largest Exclusive Spark Plug Manufacturers in the World

Jones Speedometer



Is the Standard of the World. Winner of the Gold Medal. Proven accurate by the leading Universities. Constructed on the principle of Centrifical Force.

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TRUCK FRAMES

Automobile Frames and Special Stampings

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

American AXLES



Write today for our booklet
THE AMERICAN BALL-BEARING COMPANY
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SOMETHING EQUAL TO THE BEST WHATEVER THE PRICE

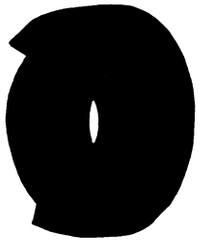
Stands for KLINE KAR Satisfied Owners

4-30	$1700 $1850	4-40	$2200 $2350	6-50	$2800 $2950	6-60	$3300 $3600

The above models completely equipped according to price with Top, Glass Front, Tire Irons, Detachable Demountable Rims, Self Starter, Combination Electric-Oil Side and Tail Lamps, Storage Battery, 4 Speed Transmission.

We have a proposition that will interest any live agent. Complete specifications and catalog upon request.

Richmond, Va. KLINE MOTOR CAR CORPORATION York, Pa.



The superiority of

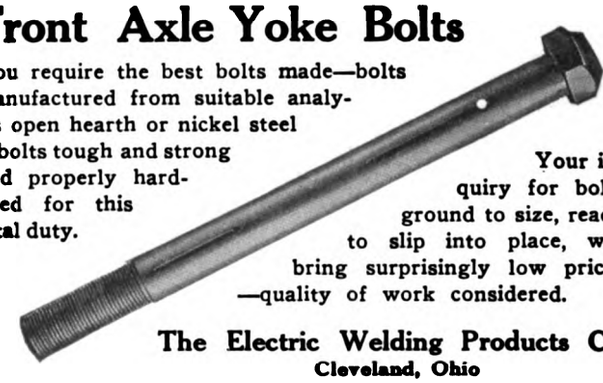
Schafer Ball Bearings

is conclusively proven by the fact that they are used in the leading cars throughout the world.

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42 Broadway NEW YORK CITY

Front Axle Yoke Bolts

You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel—bolts tough and strong and properly hardened for this vital duty.



Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

The Electric Welding Products Co.
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Best on Earth — Kantsamore
ESTABLISHED 1855

Phineas Jones & Company
305-313 Market Street, Newark. N. J.
Branch Factory: 12th Avenue and 55th Street, New York City

Automobile Wheels
For Pleasure Cars and Trucks

Repairing and truing old wheels a specialty. Experimental wheels a specialty. We furnish and apply any style demountable or detachable rim or tire.

Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.
R. B. ABBOTT SALES CO., Sales Agents, Detroit

M&P

1000 Lb. Electric Truck Standard in Every Detail

Sets a new mark in quality, service, efficiency and economy.

Bare Chassis including Driver's Seat $1450 Express Body $1500 Panel Body $1600

The first electric truck at a popular price. Write or wire for catalog and proposition.

M & P ELECTRIC VEHICLE COMPANY
Franklin and Dubois Sts., Detroit, Mich.

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PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

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An Announcement

of vital importance to every Manufacturer, Dealer and Car Owner will be made in the near future. Watch for it and read it.

Manufacturers and Dealers Motor Fire Insurance Company
(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

1440 North American Building
Philadelphia

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Warning Signal Problem Solved.

THE TUTO horn has solved the warning signal problem for the public, the car owner and the car manufacturer, by providing two separate signals, a low one for all ordinary purposes (replacing the bulb horn) and a loud note for emergency or for use when the low note fails to attract instant attention.

¶ The TUTO horn produces these two distinct signals by the use of one horn, one button, one cord and one battery and the completeness of the fixtures make it possible to have a neat and most reliable job of installing, which is devoid of troubles and insures constant operation.

¶ The special TUTO fixtures make it possible to place the button on the steering wheel, right under the thumb so as to be operated without any effort on the part of the driver.

¶ An ordinary pressure on this TUTO button produces the low-abrupt-tone, which warns effectively, fully 90 per cent. of the time. A further or complete pressure on the same button instantly gives the loud-abrupt-tone which is sufficiently strong to demand attention under extreme conditions of traffic or travel.

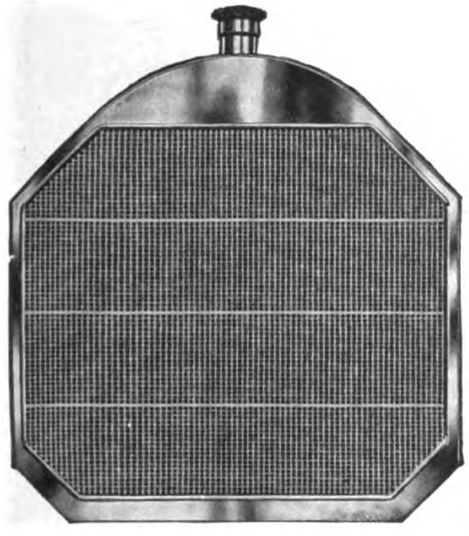
¶ The TUTO is the only horn with the "two-tone" feature, the only horn coming complete with special fixtures to make a permanent and neat installation, and therefore it is the only logical signal for standard equipment for any motor car.

The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen."

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The Mayo—the radiator thoroughbred

¶A thoroughbred in design and construction both calculated to give maximum radiating surface, long life and positive assurance against leakage.

¶Mayo, the name that stands for quality. Mayo, the radiator in high favor with discerning manufacturers, and car-wise motorists.

¶Specify Mayo to your trade.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

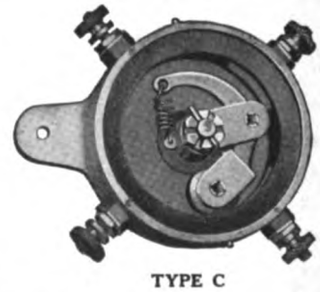
PITTSFIELD

Reliable Roller Contact Timer

Positive Contact Always Assured

THE sharp edges of the grooved roller cut through grease and other obstructions, and positive contact is guaranteed at all points every revolution.

Double ball bearings minimize wear and prevent wobbling The Pittsfield Timer will increase the efficiency of your motor 10 to 20 per cent.



TYPE C

PITTSFIELD SPARK COIL CO., Dalton, Mass.

SALES REPRESENTATIVES—*New England States, William J. Connell, 555 Boylston St., Boston, Mass. Atlantic States, Thomas J. Wetzel, 17 W. 42nd St., New York City. *Central States, Brown & Caine, 1517 Michigan Ave., Chicago, Ill. *Pacific States, Chanslor & Lyon Motor Supply Co., San Francisco, Los Angeles and Fresno, Cal., Seattle and Spokane, Wash., Portland, Ore. *Canada, Russell Motor Car Co., West Toronto, Canada.
*Full line carried.

Pittsfield Perfected

Magneto Catalog and description of our full line upon request.

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MAY WE HAVE YOUR LAYOUT

Of Bearing Installation?

¶ We can save you money, time and trouble—in other words, show you a short cut to satisfactory bearing installation.

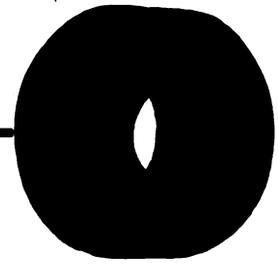
¶ The successful use of New Departures in 60% of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established.

¶ This fact also constitutes a good reason why you should send us your layout and give our engineering and sales departments an opportunity to place our proposition squarely before you.

¶ Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service.

The New Departure Mfg. Company

BRISTOL, CONN.



1016 Ford Bldg. DETROIT, MICH.

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Timken Roller Bearings Have Led the Way in Satisfactory and Economical Service



They were born before the first motor car—way back in the horse age. They gave satisfaction in the earliest motor cars. They are giving satisfaction today in more than a quarter of a million pleasure and commercial cars.

Because they are right in principle.

TIMKEN
BEARINGS & AXLES

Timken Bearings in a Motor Car
Improve Service and Reduce Upkeep

The way to strong, safe, satisfactory axle-construction was blazed by Timken.

The one-piece, pressed-steel housing which adds wonderfully to rear axle strength was introduced by Timken.

The "unit" power-transmitting plant in rear axles—so easy to get at—is a Timken contribution which has lowered upkeep cost.

The grinding of gears by special Timken-designed machines that remove all the minute inaccuracies left by the finest gear-cutting machines—is exclusively Timken, and makes for smooth, quiet running.

Timken leadership in axles is due to an immense organization of experienced, able, loyal men whose sole object in life is to make axles of the highest possible quality.

To know Timken-Detroit axles is to have a higher appreciation of the wonders of motor-car construction

Timken Bearings improve service because they are so designed that they do to the best advantage ALL the things which the bearings in a car must do.

They reduce friction loss to almost nothing.

They carry heavier load in proportion to their size—because they carry it along the whole length of rollers, not on the points of balls.

They meet side pressure or "end-thrust," because the rollers are tapered and revolve at an angle to the shaft.

They show almost no wear—because the load is evenly distributed over a large enough area of contact.

Therefore they meet and take up the shocks, strains and stresses of travel.

They keep the wheels from wobbling.

They keep shafts perfectly aligned and gears in mesh—insuring perfect transmission of power.

Timken Bearings reduce upkeep because they last longer and do not have to be replaced.

This is, first of all, because they wear so little.

It is also because even that slight wear can be wholly taken up by adjustment—by advancing the cone into the cup.

Perfect adjustment is possible because all the surfaces are tapered and after adjustment meet in straight lines just as they did before.

The perfect alignment is assured in two ways:

By a pressed steel "cage" that guides the rollers on the cone.

By the *two ribs on the cone* that hold the alignment of the rollers when under load.

Non-adjustable bearings steadily give worse service, till at last they are beyond help and must be replaced bodily.

Timken Tapered Roller Bearings of proper size, properly mounted and properly cared for, outlast the car, and give continuous good service.

THE TIMKEN ROLLER BEARING CO.
CANTON, OHIO
THE TIMKEN-DETROIT AXLE CO.
DETROIT, MICH

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(Reproduction of Front Cover of our 1912 Annual Catalog which is printed in three colors.)

OUR 1912 CATALOG

the Largest and Most Complete Catalog of the kind, containing 256 Pages, is Now Ready for Distribution. The Circulation is Limited to ONE HUNDRED THOUSAND Copies. It will be mailed to any one on request.

Cut Prices

Concerns that offer Large Discounts make it their practice to INFLATE LIST PRICES and then offer Large Discounts, which are somewhat misleading. We have seen a catalog in which a certain spark plug is illustrated, "PRICE $2.50, OUR PRICE $1.00," while THE STANDARD LIST or RETAIL PRICE for the same spark plug as illustrated in OUR 1912 ANNUAL CATALOG and advertised by the manufacturers is $1.00 each. Their CUT PRICE therefore Is Not Lower Than OUR LIST PRICE.

Don't Be Deceived by Large Discounts

Quoted from Inflated List Prices

ORDER FROM OUR NEAREST BRANCH

Get the Right Prices **Save Express Charges**

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Manufacturer, Jobber, Exporter and Importer

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ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

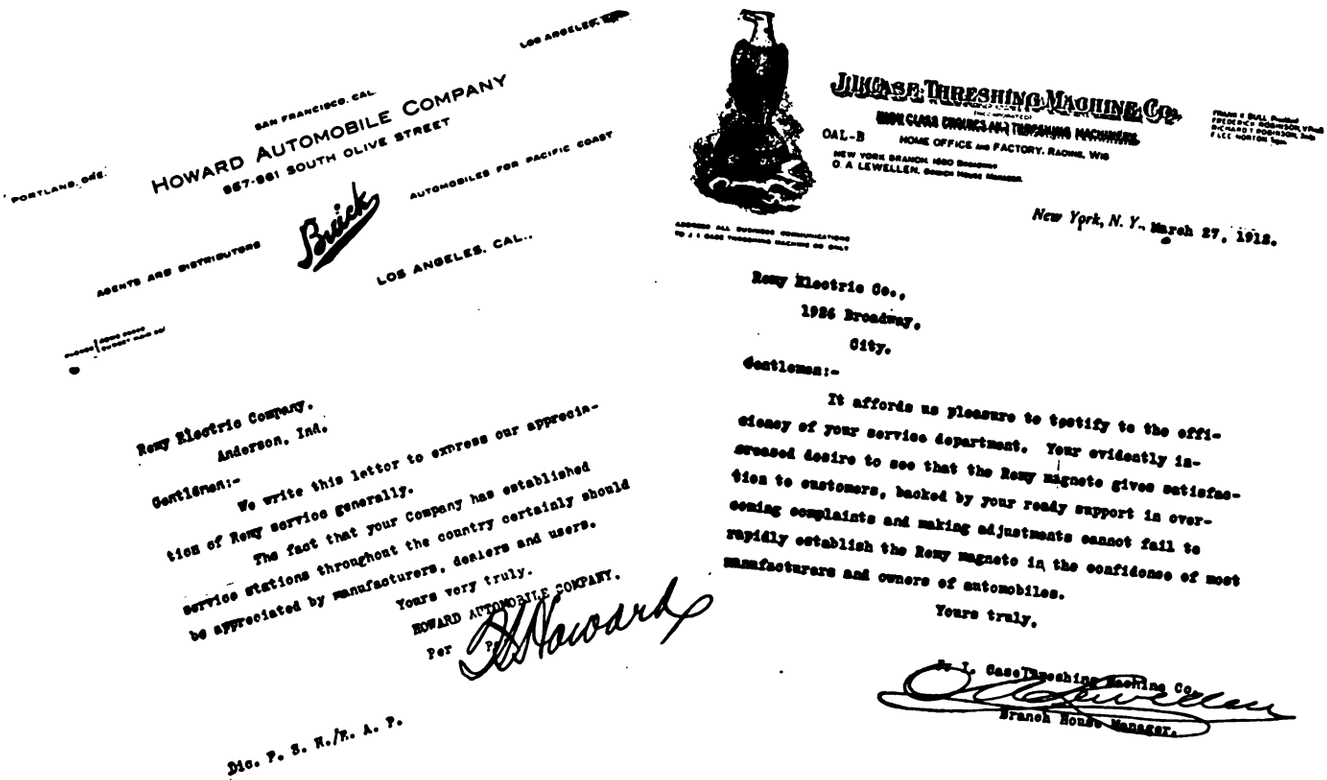
NEW YORK CITY 97-103 Reade Street	BROOKLYN, N. Y. 1421 Bedford Avenue	BOSTON, MASS. 202-204 Columbus Ave.	DETROIT, MICH. 227-229 Jefferson Avenue	ATLANTA, GA. 66 Edgewood Avenue
NEW YORK CITY 924 Eighth Avenue	BUFFALO, N. Y. 824 Main Street	SPRINGFIELD, MASS. Bridge & Dwight Sts.	CLEVELAND, O. 1829 Euclid Avenue	NEW ORLEANS, LA. 601-603 Baronne St.
NEW YORK CITY 2782 Broadway	ALBANY, N. Y. 135 Central Avenue	HARTFORD, CONN. 274 Trumbull Street	PHILADELPRIA, PA. 318 North Broad St.	NEWARK, N. J. 274 Halsey Street

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Manufacturers and Dealers

What Does Service Like This Mean to You

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HOWARD AUTOMOBILE COMPANY
857-861 SOUTH OLIVE STREET
LOS ANGELES, CAL.

Buick

AUTOMOBILES FOR PACIFIC COAST

Remy Electric Company.
Anderson, Ind.

Gentlemen:-

We write this letter to express our appreciation of Remy service generally.

The fact that your Company has established service stations throughout the country certainly should be appreciated by manufacturers, dealers and users.

Yours very truly.
HOWARD AUTOMOBILE COMPANY.
Per

Dic. F. S. H./K. A. P.

J.I. CASE THRESHING MACHINE CO.
HOME OFFICE and FACTORY, RACINE, WIS

New York, N. Y., March 27, 1918.

Remy Electric Co.,
1926 Broadway,
City.

Gentlemen:-

It affords us pleasure to testify to the efficiency of your service department. Your evidently increased desire to see that the Remy magneto gives satisfaction to customers, backed by your ready support in overcoming complaints and making adjustments cannot fail to rapidly establish the Remy magneto in the confidence of most manufacturers and owners of automobiles.

Yours truly,

J. I. Case Threshing Machine Co.
Branch House Manager.

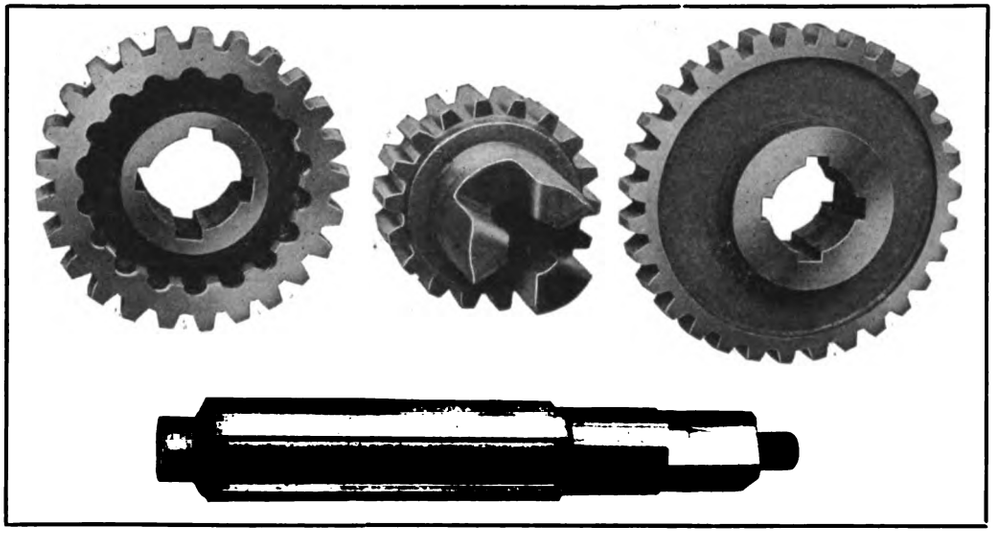
Did you ever hear of Ignition Service before the Remy Electric Company created it?

Are you taking advantage of this Remy Service, making it a valuable part of your complete car service?
Let us tell you more about the The Best Magneto and Real Magneto Service.

Factories and General Offices at Anderson, Ind.

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Grant-Lees



Gears

Four Reasons Why

Because—

(a) They are the most accurately machined.
(b) They contain the best materials which have been proven best by actual working tests.
(c) They are scientifically heat-treated.
(d) They arrive when promised.

Pioneers of the Helical Gear in the United States.
Differentials, Worm-Gears and also Worms.

GRANT-LEES MACHINE COMPANY
Cleveland, Ohio

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The first *definite* guarantee of *actual* mileage ever given on tires, now goes with all

PENNSYLVANIA VACUUM CUP TIRES

Three factors are making these tires the stellar attraction in the trade for 1912

The 4,000-mile actual and definite guarantee attached to every tire.

The unique guarantee that the vacuum cups *will not* skid on slippery pavements, or full price refunded.

And lastly, the tremendous demand for tires providing a dependable standard of practical and satisfactory service.

Prices, terms and all information supplied you immediately.

PENNSYLVANIA RUBBER CO., Jeannette, Pa.

Reorganized February 1, 1910

Pittsburgh, 505 Liberty Ave. — Detroit, 254 Jefferson Ave.
Chicago, 1004 Michigan Ave. — Minneapolis, 34 S. Eighth St.
Kansas City, Mo., 514 E. 15th St. — Cleveland, 1837 Euclid Ave.

PENNSYLVANIA RUBBER CO. of New York
New York City, 1700 Broadway

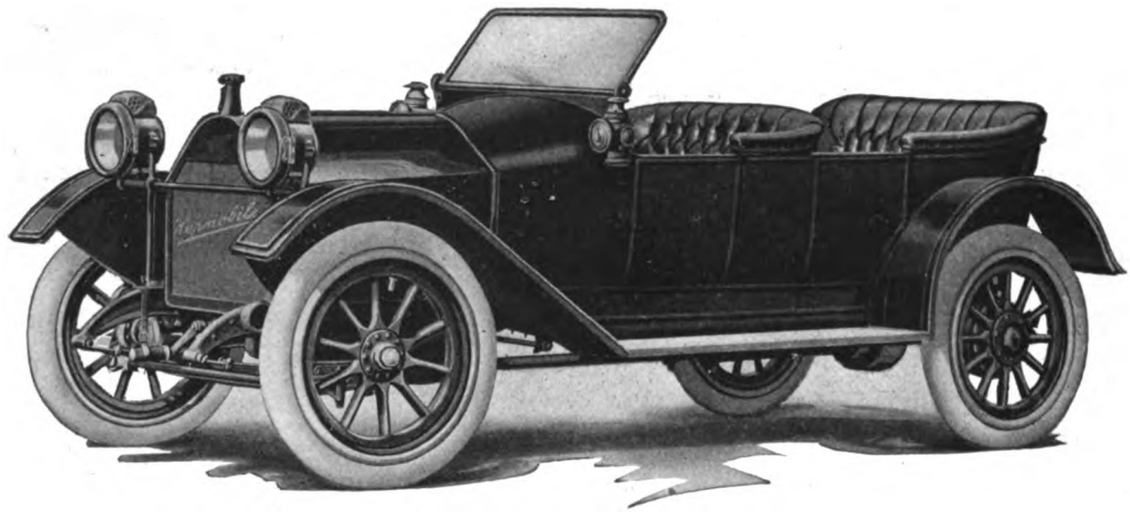
PENNSYLVANIA RUBBER CO. of California
San Francisco, 512-514 Mission St. — Los Angeles, 930 S. Main St.

An Independent Company with an Independent Selling Policy.

NON SKID TRADE MARK REG. U.S. PAT. OFF.

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Hupmobile



Long Stroke "32" Touring Car—$900

F. O. B. Detroit, including equipment of windshield, gas lamps and generator, oil lamps, tools and horn. Three speeds forward and reverse; sliding gears. Four cylinder motor, 3¼-inch bore and 5½-inch stroke; Bosch magneto; 106-inch wheelbase; 32 x 3½-inch tires. Color, Standard Blue.

Not the Price; Not the Specifications; But—the Name Added to Both

You would do this car **less than justice** if you judged it by its price.

You would **fail to do it full justice** if you judged it by the generous specifications.

It is what the car has always stood for, that renders the price remarkable.

It is the Hupmobile record; and the Hupmobile reputation; that emphasize the extraordinary character of the specifications.

The price is not, in itself sensational—but the high standard of Hupmobile practice, at that price, **is** sensational.

You do not sell certain large cars of highest price because they boast a longer wheelbase; or more generous proportions in any part of the chassis.

You sell them because their name and their word have always been synonymous with service and worth.

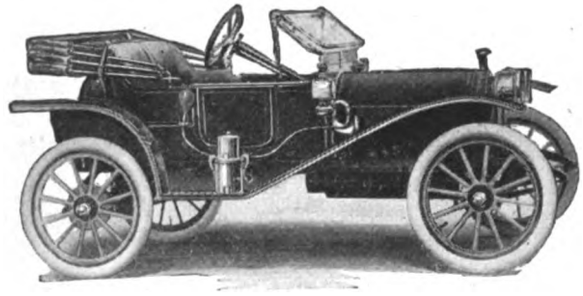
And, in its class, the Hupmobile has always held its ideals as high as cars of the highest worth.

It has shown itself worthy of a place beside them—worthy to share the same garage; it has fulfilled its mission as efficiently as they fulfill theirs.

Bear these things in mind as you study the cars in detail—then, and not till then, will you fully realize the remarkable value embodied in the price and in the specifications.

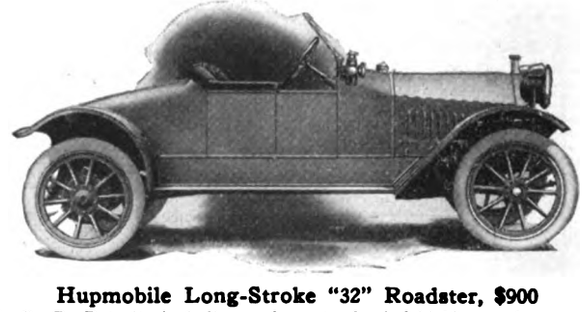
We are quite willing that you should compare this new Hupmobile with cars which sell for several hundred dollars more.

We will cheerfully abide by your decision, if it does not demonstrate either equality or superiority in any definite and positive test which you may designate.



Standard 20 H. P. Runabout, $750

F. O. B. Detroit, with same power plant that took the world-touring car around the world—4 cylinders, 20 H. P., sliding gears, Bosch magneto. Equipped with top, windshield, gas lamps and generator, oil lamps, tools and horn. Roadster, 110-inch wheelbase, $850.



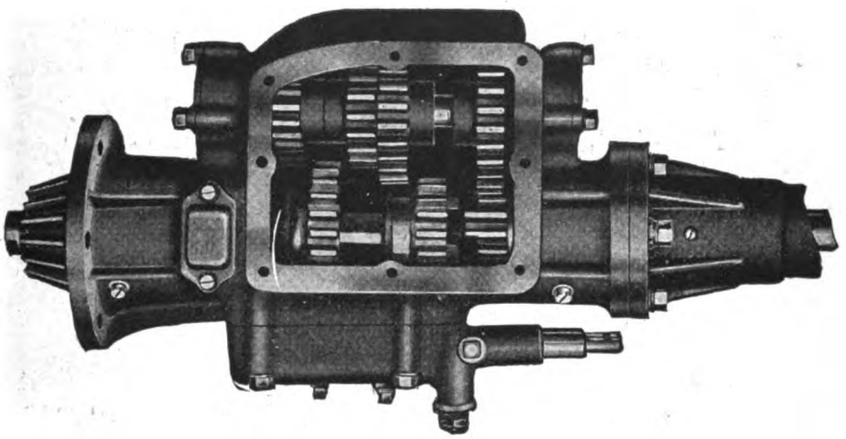
Hupmobile Long-Stroke "32" Roadster, $900

F. O. B. Detroit, including quipment of windshield, gas lamps and generator, oil lamps, tools and horn. Three speeds forward and reverse; sliding gears. Four cylinder motor, 3¼-inch bore and 5½-inch stroke; Bosch magneto; 106-inch wheelbase; 32 x 3½-inch tires. Color, Standard Blue.

HUPP MOTOR CAR COMPANY, 1254 Jefferson Ave., Detroit, Mich.

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COVERT



Simplicity of construction, durability, and high efficiency are the three best selling points of the COVERT UNIT TRANSMISSION PLANTS.

Think of the saving of cost in assembling by reason of the simpleness of the construction. Think of a transmission, the gears, shafts and bearings of which are made of nickel steel, carbonized, heat treated and ground to accurate measurements. Think of high efficiency produced by concentration of effort on one particular product.

Think of Covert Unit Transmission Plants embodying these three points and many more of great importance to the Truck Manufacturer and then allow us to go over your Transmission problem with you.

Covert Motor Vehicle Co.
Sales Office, Ford Bldg.
Detroit, Mich.
Factory, Lockport, N. Y.

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Sounds Like An Irish Bull

We charge the *least* for the Stewart Speedometer because it's the *best* speedometer. Sounds like an Irish Bull, doesn't it? But the argument is sound.

The better an article the better it pleases users. The better it pleases users the larger its *sale*. The larger its sale the less the cost of *producing* it. For the oftener a machine is used the less is the machine charge on each part it makes.

A smaller *cost* makes a bigger demand—and a bigger *demand* makes it easier to install *still* faster and *better* machinery.

That's the story of the Stewart Speedometer. That's why we can afford to make the finest speedometer on earth and ask the least for it.

It's the best ever *known;* but the *price* hasn't grown.

Not an *aristocrat*—it *works.*



Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial—large figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft—drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB."

STEWART & CLARK MANUFACTURING COMPANY

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit Minneapolis Chicago Los Angeles Boston Cleveland New York San Francisco Kansas City London Philadelphia Paris Indianapolis

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The Stearns-Knight Car

The Vital Point

Remember that the engine is the heart of your car. All else is of minor importance.

So the points discussed here overshadow all others, if you want a modern car.

They call for your attention.

10,000 Cars

Have Knight-Type Engines in Them

These cars bear names which stand the world over for the utmost in automobiles.

They were built by engineers who have always led in this industry.

They are owned by men who demand the best.

These 10,000 cars—the greatest cars in existence—have proved that Knight-type engines are the coming type.

Daimler—England's foremost car—controls the British rights. That has been a Knight-type since 1908, and its sales have quadrupled since then.

Mercedes controls the German rights. Panhard for France, Minerva for Belgium.

Thus the master engines of the world have been displaced by Knight-types.

A Knight-type engine won the Dewar Trophy in the greatest engine test on record.

It won the Scottish Economy Trophy. It holds world records on points that count for most.

That's why we adopted it for the Stearns-Knight, after two years of rigorous tests.

"Wait and See"

Makers of poppet-valve engines say, "Wait and see."

But the Knight-type is six years old. Daimler has used it since 1908.

One after another, the greatest makers in Europe have been forced to pay royalty for it. It is used now in 17 famous makes of cars.

Some $25,000,000 has been already invested in Knight-motored cars of the highest grade.

And the demand for Knight-type cars today is three times the possible output.

How much longer is it wise to wait? We waited three years after Europe came to it. We were not willing converts.

But we know when progress can't be longer stopped. The cars of the future will be Knight-type cars.

We were compelled by the evidence—as you will be—to come to this type of car.

Like Coasting

It is almost like coasting all the time to ride in a Stearns-Knight car.

The silence is almost uncanny.

No valves to pound open, no valves to spring shut—hundreds of times a minute.

No cams to grow noisy, no timing gears to hum.

No valves to grind. No carbon to cause leakage.

There is luxury of motion in a Stearns-Knight, known in no old-type car.

It's like gliding on the road. All the evidence of effort to which you are accustomed is lacking in this car.

There is wondrous flexibility. There is that continuous power for which electric motors are famous.

And the engines grow better with use. They show more and more power. We have Knight-type engines run for six years which are as quiet and efficient as when new.

Equipment

Warner Auto-Meter, Model K.
Banker Windshield.
Silk Mohair Top and Cover.
Vesta Dynamo Electric Lighting System.
Continental Q. D. Demountable Rims (two extra rims).
Klaxon Horn—also Bulb Horn.
Trunk Rack, Robe Rail, Foot Rest, etc.

Touring Car
Toy Tonneau
Roadster
$3,500

One-Half More Power

Stearns-Knight engines are rated on the poppet-valve basis.

But we guarantee the engines to show at least 50 per cent more than the rated power.

This is due in part to the spherical firing chamber. It is mostly due to the saving of leakage.

Poppet valves are rarely tight. When carbon accumulates the waste of power is enormous.

Judge for yourself what this saving means during the life of a car.

These are advantages too great to be disregarded.

The greatest engineers have had to adopt them. And most of the others are now seeking ways to end the poppet valve.

The time is fast coming when all high grade cars must have a new-type engine.

A Costly Change

Engineers have spent over $1,000,000 in perfecting the Knight-type motor.

We have ourselves spent $200,000, plus two full years, to meet American requirements.

Then this engine requires far more careful construction in every detail of the car.

Noises which were drowned by the old-type motors show up with the Silent Knight.

So this innovation was costly.

But our sales have doubled since the Stearns-Knight came out. They have compelled a new factory. At times our output was three times oversold.

This multiplied demand makes the Stearns cost less than any other Knight-type in America.

Hundreds Know

Hundreds of Stearns-Knight cars, in the hands of owners, have covered thousands of miles of road. The owners are men who know cars—men who demand the best.

The letters we get from them form the highest tribute ever paid to an American car.

The facts which won them will win you when you know them. They are the same facts which won 10,000 buyers in Europe.

They are irresistible to any man who wants the utmost in a car.

The Future Type

The evidence is that the leading cars of the future are bound to be Knight-motored cars.

History shows that what Daimler, Mercedes and Panhard adopt will soon mark the best cars the world over.

In buying a car for years to come, this fact should be well considered. You want the coming, not the passing type.

In two more years Knight-types will be common among high grade cars—as in Europe now. Today the Knight-type, in its perfection, means in America a Stearns-Knight car.

Go See This Car

Go to your local dealer and see this Stearns-Knight car.

But first write for our books. Get all the facts. Then judge for yourself if Knight-type is the future type.

Write now for these books. The Stearns-Knight car is the topic of the year in Motordom. Cut out this coupon, mail it to us, and we'll send all the interesting facts.

THE F. B. STEARNS COMPANY

Cleveland Stearns City

Dealers and Branches in
125 Principal Cities

Coupon

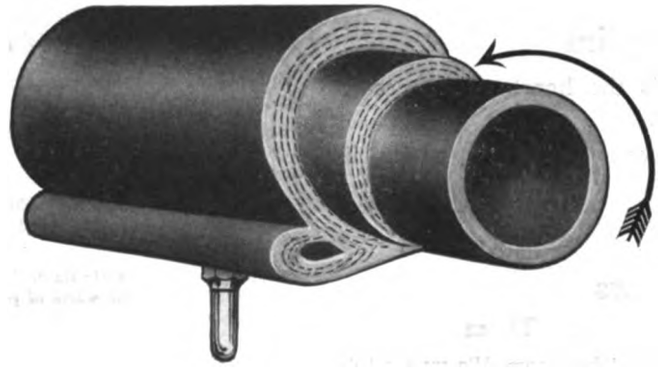
THE F. B. STEARNS CO. (19-A)
Cleveland, Ohio

Mail me all of your pamphlets about the Stearns-Knight.

Name .....

Address .....

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There Is Only One "INNERSHU" The Genuine Bear This Mark

"INNERSHU"

TRADE MARK

Look for the Red Circle Trade Mark. Accept No Other

Stops Ninety Per Cent. of Tire Troubles

Stops Punctures—Stops Blow-outs

The claims made above are none too strong. If every automobile dealer and user realized the absolute truth of what we say we could not begin to supply the demand. Consider that the genuine

"Innershu" is Sold and Recommended by Over 2500 Dealers

Could there be any stronger proof? Consider that 1911 replacements amounted to less than one tenth of one per cent. of the sales. Is there any better evidence of "Innershu" efficiency? It does the work exactly as we claim. That's the whole story.

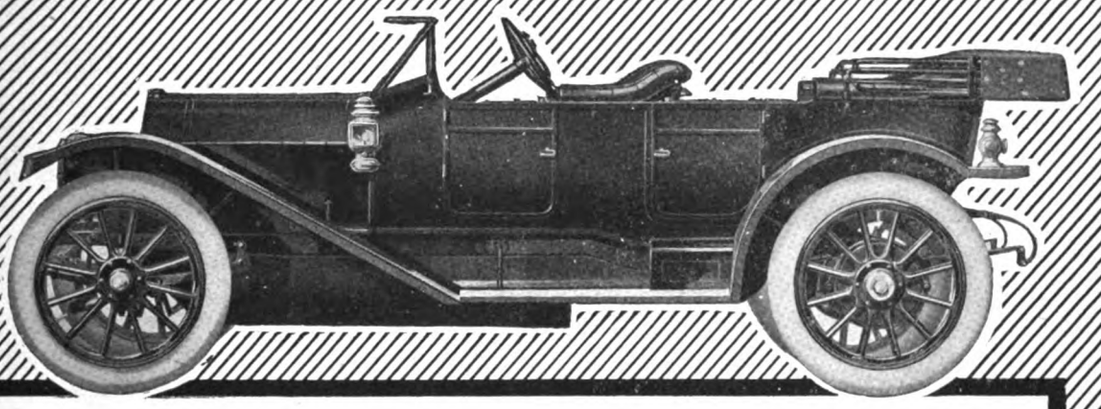
Thousands of testimonial letters from automobile owners, constantly growing sales and numerous imitations all point to "Innershu" popularity.

Dealers selling "Innershu" don't go it alone; we help them—shall we tell you how? It's worth while to find out. You can't write too soon.

INNER SHOE TIRE COMPANY, Grand Rapids, Mich.

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EVERY INCH A CAR



Service Everywhere

SERVICE BUILDINGS in principal cities throughout the United States, with effective service organizations and equipments cooperate with selling branches and agencies in extending completest service to KisselKar owners, both of pleasure models and commercial vehicles.

Whatever might go wrong is made right without long waits or annoyances. KisselKar service is the kind that minimizes operating costs and depreciation, and insures the fullest car satisfaction.

"Thirty" $1500 — "Forty" $1850
"Fifty" $2350 — 60 H. P. "Six" $3000

Prices except on the "Thirty" include full equipment—top, wind shield, detachable rims, shock absorbers, speedometer, etc. —everything belonging to a perfectly dressed car. The "Thirty" has more than usual equipment.

Write for 1912 Catalog—one of the most informing automobile books published.

Kissel Motor Car Co., 159 Kissel Avenue, Hartford, Wisconsin

Boston—New York—Chicago—Milwaukee—Kansas City—Los Angeles—Minneapolis

Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

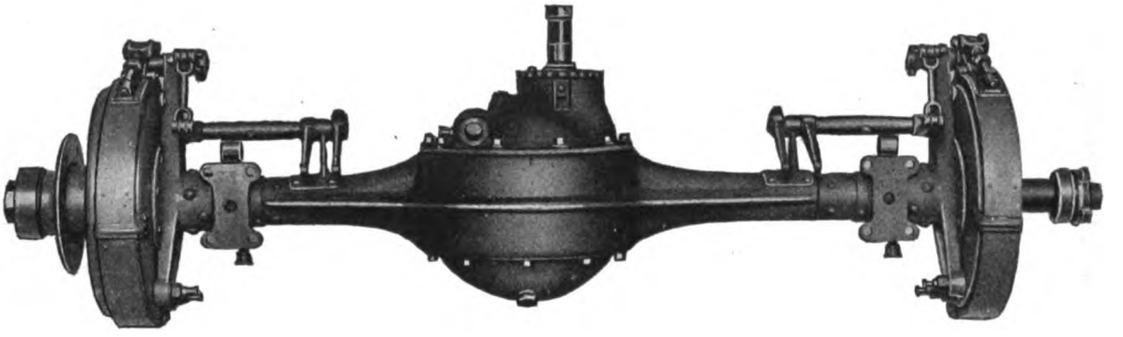
KISSELKAR

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American American

American Axles

Now Include the Lanchester Worm Drive as Well as the Bevel Type of Gear



The name Lanchester acquires new distinction by reason of its association with the word American.

American Axles in America stand for the same high manufacturing ideals that Lanchester implies in England.

The association of these two types creates an invincible combination, giving you the option of either form of drive, with the full assurance that each is unrivaled in its own domain.

American Axles fitted with either the bevel or worm drive, can be furnished for cars weighing up to 4,500 pounds and 60 horsepower.

Annular ball bearings are used throughout, with ample and adequate thrust bearings. Hubs may be equipped with either the annular or taper roller bearings.



THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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One or the other of these starters will suit your every customer.

The Valentine MANIFOLD STARTER and Gas Lighter

Price $10

This manifold self starter is the equal of any manifold self starter—about the only starter that is more efficient is the Hanna Self Starter. The Gas Lighter alone is worth the price we ask for both lighter and starter.

Self HANNA Starter

Price $35

The first acetylene self starter on the market. The only 100 per cent. efficient starter that does not foul or soot your plugs. There is no other starter made that begins to compare with the Hanna. Simple, economical, works on any car.

We Want More Distributors

Our proposition to dealers is fair and liberal. There isn't a better seller on the market—and best of all our starters absolutely make good. We guarantee it and back dealers to the limit. If you're looking for a live proposition write us.

C. L. ACKERSON,
135 Home St., Winnipeg, Canada.

AUTO STARTING DEVICE CO.,
34½ Peachtree St., Atlanta, Ga.

L. E. BELCHER,
318 Main St., Springfield, Mass.

FOGARTY & DICKINSON,
San Luis, Potosi, Mexico.

S. NEAL HALLOCK,
46 Long St., Columbus, Ohio.

HANNA STARTER SALES CO.,
Baltimore, Md.

HANNA STARTER SALES CO.,
704 Main St., Buffalo, N. Y.

HANNA STARTER SALES CO.,
410 E. Market St., Elmira, N. Y.

HANNA STARTER SALES CO.,
1414 Penn Square, Philadelphia, Pa.

HANNA STARTER SALES CO.,
31 Clinton St., Rochester, N. Y.

E. F. McDONALD, JR.,
2125 Michigan Ave., Chicago, Ill.

W. S. McDONALD,
1001 Majestic Bldg., Detroit, Mich.

MOHLER & DeGRESS,
Ave. 16 De Septembre, No. 18, Mexico, D. F.

A. RAWLINSON,
479 Oxford St., London, England.

F. H. RYAN & H. J. FANNING,
Tunkhannock, Pa.

THE FISK CO. OF TEXAS,
San Antonio, Texas; Dallas, Texas.

THE MOTOR VEHICLE CO.,
903 Boylston St., Boston, Mass.

F. C. TURNER,
22 Rua General Camara, Rio de Janeiro, Brazil.

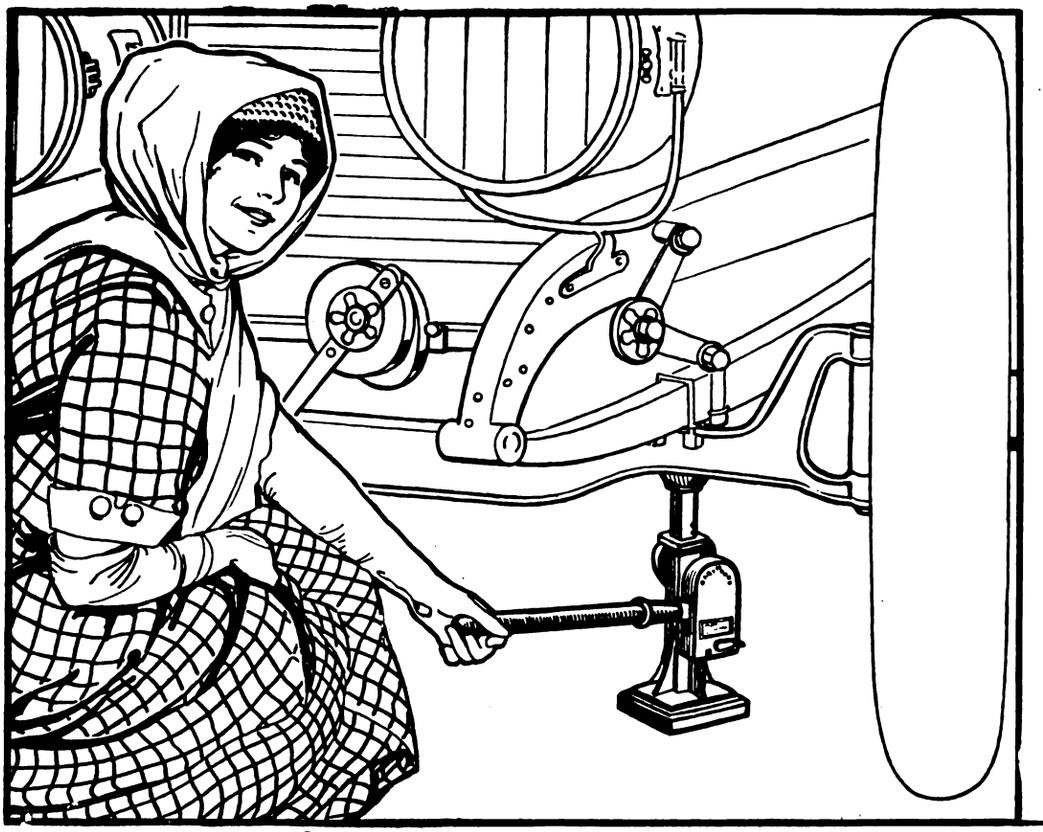
WATERBURY WELDING CO.,
1148 S. Main St., Waterbury, Conn.

WESTERN MOTOR CAR CO.,
1512 Broadway, Denver, Colo.

PERCY WILLIS,
Waco, Texas.

J. H. VALENTINE CO. Syracuse New York

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Save your knuckles by using this Jack

It's mighty disagreeable to try to lift a car with an ordinary jack and bark your knuckles. There's no such trouble with the Hartford Auto-Jack. Its long handle clears the under parts of the car and saves your knuckles.

The Hartford *saves your back*, too. It lifts a car with *one-third the effort* required by the ordinary jack. It does the hardest part of the "Strong-arm Work" so that just a movement of the wrist lifts a heavy car easily. The gears are scientifically arranged to *multiply energy*, so that slight pressure on the long lever lifts a car as if by magic.

And by a turn of the unique and convenient reversing lever down comes the car without a jerk. The action is smooth and sure both ways—*efficient*. The

Hartford Auto-Jack

is so *simple* a woman or child can operate it. Can't get out of order or get stuck. The ratchet never slips.

Maximum strength results in minimum wear. The Hartford is the strongest, sturdiest, most durable jack on the market. With a Hartford you're jack-equipped for life.

Sold by Dealers Everywhere

Almost every dealer sells the Hartford Auto-Jack. But if your dealer hasn't one in stock, we will send you one on receipt of price, with our *guarantee* to return your money at once, if you are not entirely satisfied.

The price of the Hartford, in a strong canvas containing-bag, is $8.00. A safe buy. Be sure it's a Hartford and get *superior service—now*.

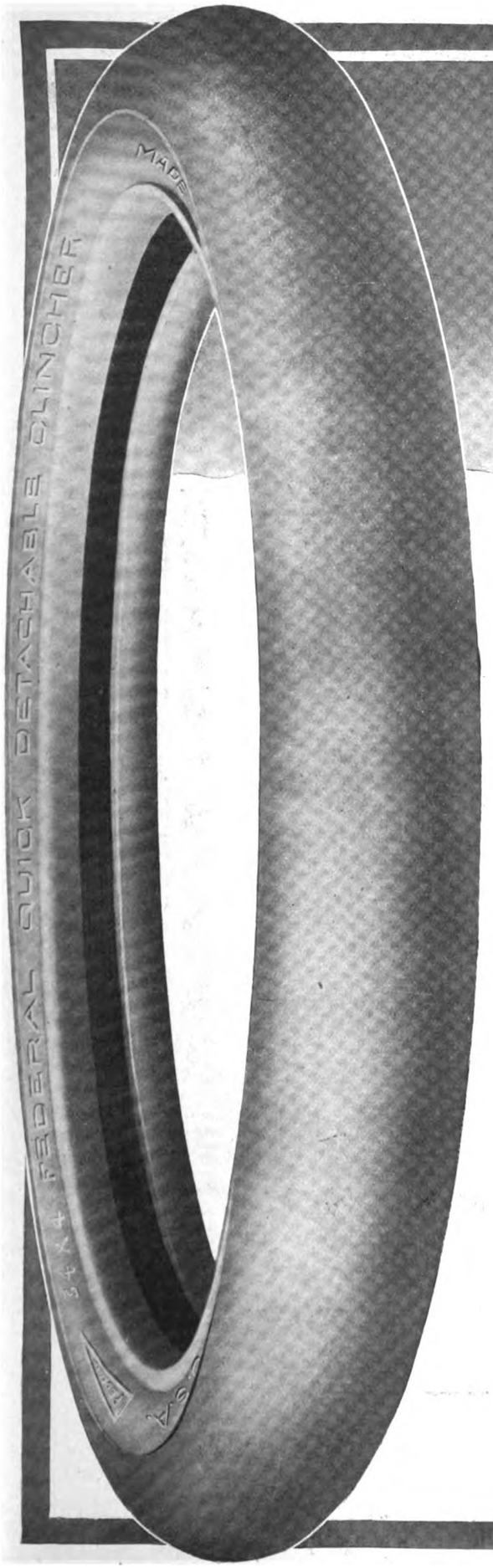
HARTFORD SUSPENSION COMPANY

Edw. V. Hartford, *Pres.* **164 Bay St., Jersey City, N. J.**

BRANCHES: New York, 1700 Broadway, 212-214 W. 86th Street

Chicago, 1458 Michigan Avenue
Philadelphia, 1437 Vine Street
Boston, 325 Columbus Avenue
Newark, 289 Halsey Street
Kansas City, 1524 Grand Avenue
Detroit, 870 Woodward Avenue

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FEDERAL TIRES

"Extra Service" Tires

FEDERAL TIRES are always *uniform*. You get the very *limit of mileage* out of every Federal Tire you use. This gives you a certainty in tire service—a knowledge of mileage that your tire equipment is capable of giving under all varying road conditions.

Federal Tires are tires of *unusual* quality. It is utterly impossible to use finer materials, or exercise greater skill in their construction, and as a result of this care and expense in their making they deliver the utmost in mileage service.

Automobile owners who know that quality is the secret of low up-keep expense recognize Federal Tires as the "Extra Service" tires.

Federal Tires are made in *Rugged Tread* (non-skid) and *Round Tread* types, for all rims.

Federal Tires are procurable at leading dealers. Write for interesting booklet.

Federal Rubber Manufacturing Co.
Milwaukee

Branches and Agencies:
New York, Boston, Chicago, Kansas City, Denver, Atlanta, Los Angeles, Pasadena, San Diego, Portland, Louisville, Indianapolis.

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Overland

WE WANT to make it plain to you the extra value in the thirty-five horsepower Overland Model 60. It sells at $1200, but as popular priced cars go, it should be priced at $1500. This car is a bargain.

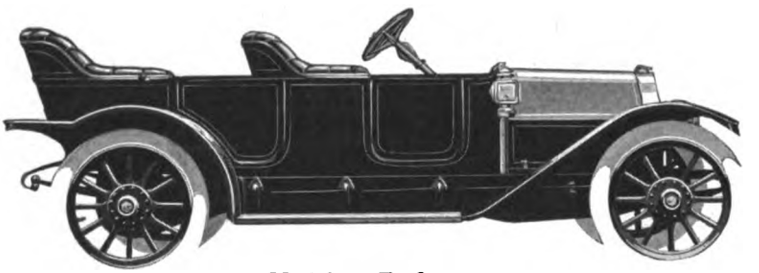
The word bargain has seldom appeared in motor car literature. It is looked on as a synonym of cut-rate.

The Overland Model 60 at $1200 is a bargain. It is more car for less money. The word fits. This Model 60 is made by the most perfect organization in the most efficient plant in the country.

This car is a product of Willys-Overland ninety-five per cent. efficiency methods; hence the bargain.

Write for Book I-44.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, April 18, 1912. No. 4

"ARMED TRUCE" IN TIRE TRADE

Diamond Meets Goodrich Prices, but United States "Stands Pat"—Bitterness Exists, but "War" Unlikely.

Because of the tense situation which existed in the tire trade during all of last week, due to the deep cut in Goodrich prices, it was expected that the present week would be marked by more or less acute developments. It was known that no little personal feeling had been aroused, and that it had given rise to threats by men in position to make them as to what might be done if certain things came to pass, or if they became ruffled to the slashing point, all of which threats proved vain because of the failure of the contingencies to arise.

On Monday, however, the Diamond Rubber Co. met the Goodrich quotations, but a day later the United States Tire Co. assumed a directly contrary attitude, and, instead of meeting the reductions, made it known that its list prices, which are approximately 16 per cent. higer than the Goodrich and Diamond figures, will be guaranteed against reduction until July 1st next. Taking, for example, the most popular size of tire, 34 x 4 inches, this means that the Goodrich and Diamond prices stand at $31.30, while the United States quotation for the same tire is $33.60. The Fisk Rubber Co., which was in the forefront of the reduction movement, also is holding fast to the $33.60 figure.

The Firestone Tire & Rubber Co. has made a reduction of about 12½ per cent. from its list prices, but as they have always ruled several dollars higher than those of the other prominent tire manufacturers, the Firestone position remains relatively unchanged.

In a sense, it may be said that an armed truce prevails, but the feeling is such, in certain quarters, that it would not take great provocation to cause renewed animation of a very vigorous sort. The action of the United States Tire Co. in guaranteeing its prices has served, however, to minimize the likelihood and to lessen the chance of a real "fight." In circular letters to the trade, the United States Co. and the B. F. Goodrich Co. have "exchanged compliments" and sought to show how each is acting for the best interests of the dealer. Each "denies the allegation and defies the allegator," so to speak, and both make fairly plain that they do not admire the attitude or arguments adopted by each other, or at any rate not as much as they admired the attitudes and arguments brought to bear in the "good old days."

To Produce Trucks in North Carolina.

J. L. Owens & Son, of Charlotte, N. C., who have been identified with the horse wagon industry for many years, have converted their business into a corporation, styled the Owens Wagon and Automobile Works, which is capitalized with $50,000. Hereafter motor wagons will be manufactured in addition to horse wagons and carriages. The officers of the new company are J. L. Owens, president; Frank O. Owens, vice-president, and Skinner S. Alston, secretary and treasurer.

Crosby Brings Suit Against Grabowsky.

Suit was instituted last week in the Wayne County Circuit Court, in Detroit, by the Crosby Co., of Buffalo, N. Y., against the Grabowsky Power Wagon Co., of Detroit, the sum involved being $1,127.32. The action is based on a promissory note dated January 2, 1912, for $564.59, given to secure payment for sheet metal stampings previously purchased, and an invoice of January 31, 1912, for the same kind of material, amounting to $562.73.

Braden Relinquishes Diamond Advertising.

Because of indifferent health, James A. Braden, for many years advertising manager for the Diamond Rubber Co. of Akron, O., has resigned that office and now is traveling in the South in an endeavor to recuperate. He has been succeeded by Clyde S. Thompson, formerly with the Fowler-Simpson advertising agency, of Cleveland.

ALLEN AGAIN BEATS THE BANKERS

Supreme Court Gives Him Judgment for Full Amount—Echo of High Finance and Allen-Kingston Car.

Judgment for $29,553.44 was given by the Supreme Court of New York on Monday last, 15th inst., in favor of the Allen-Kingston Motor Car Co. against E. R. Chapman, W. O. Allison and T. J. Lewis, formerly officers or directors, respectively, of the Consolidated National Bank of New York. The amount represents the sum of $23,500, which was sued for, plus the costs and interest, and the litigation recalls projects that looked large and carried large names, but which, subsequently, proved only expensive bubbles.

According to the exceedingly voluminous record of the case, which has been in the courts since 1908, the New York Supreme Court in 1909 gave a verdict in favor of the plaintiff for $23,500, but the Appellate Division set the verdict aside for technical reasons and ordered a new trial. This new trial took place last month, and again resulted in a victory for the automobile concern.

It appears that in July, 1907, Walter C. Allen, who substantially was the Allen-Kingston Motor Car Co., made a contract with the Kingston Motor Car Co. for 100 cars, which contract was guaranteed by those "high financiers," E. R. and O. F. Thomas, as owners of all of the Kingston company's stock. Allen paid the sum of $16,500 as a deposit to apply on the 100 cars, agreeing to pay $8,500 more at a future date, or until the sum of $250 had been paid for each car contracted for. He actually received six partly completed Allen-Kingston cars, which were exhibited at the automobile show in November, 1907, in New York. While the cars were on exhibition, Allen claims to have been told frankly by F. E. Moskovics of the Kingston company that it was then at the end of its resources and had used up all its available funds, in-

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cluding the plaintiff's $16,500. Allen, of course, demanded his money back.

Negotiations were then begun with the New York Car & Truck Co., in which E. R. Chapman, president of the Hudson Trust Co., was interested. Allen was told that this company would take over the contract. He acquiesced, claiming to be ignorant of the fact that the company at that time was insolvent and unable to take over such large contracts as the one with Allen, involving $270,000. Allen alleges he soon learned he had been deceived, and sued the principals in the transaction for a return of his money. By a somewhat involved stock transaction, the Thomas brothers got rid of their interest in the Kingston company, while Allen was induced to put up the extra $8,500 and to return the six half-finished cars to be completed in the Car & Truck factory. It was claimed at the first trial that by this action he lost his claim on the Thomas brothers as well as their guarantee. He then brought suit against Chapman, Lewis and Allison, principal agents in the contract transfer, and against the Consolidated National Bank, but the trial judge dismissed the part of the action directed against the bank, permitting the action against the individual officers to be continued. When the suit again came to trial, after the verdict had been set aside by the Appellate Division, it was directed solely against the individuals named, and it is this latter suit which just has been decided.

Webbing Manufacturer to Make Tires.

E. T. Rugg & Co., who for years had been engaged in the manufacture of webbing and halters in Newark, O., has formed the Newark Auto Tire Co., which is preparing to engage in the manufacture of tires in the Ohio city. E. T. Rugg is the principal owner of the new enterprise.

Death Claims Republic Rubber Official.

L. J. Lomasney, vice-president and sales manager of the Republic Rubber Co., of Youngstown, O., whose ill health forced him to relinquish active work several months ago, died at his home in Youngstown last week. He had been so seriously ill that his death was not unexpected.

Heavy Stockholder Bids for Assets.

C. E. Latimer, of Chicago, who was the heaviest stockholder and one of the directors of the bankrupt Henry Motor Car Co., of Muskegon, Mich., has made a bid for the assets. If it is accepted, it is Latimer's intention to organize a new company and continue manufacturing the Henry car.

To Build Big Plant for Rayfield Cars.

The Rayfield Motor Car Co., which recently was organized and removed from Springfield to Chrisman, Ill., is preparing to erect a new factory in the latter town. The new structure will be 316 feet long, with a width of 20 feet at one end and 134 at the other.

BIG COMPANY TAKES UP STARTERS

Secures All Rights to Eveland Electrical Flywheel Device—Will Be Manufactured at Niagara Falls.

Following negotiations which just have been completed, the United States Light & Heating Co., which heretofore has devoted its energies to the manufacture of storage batteries and railway car electric lighting and heating systems, has acquired the manufacturing and selling rights for the Eveland electric engine starting and lighting system for automobiles, and will commence its manufacture immediately in its own shops at Niagara Falls, N. Y. Hereafter it will be styled the U. S. L. Electric Self-Starter and Lighter.

The device, which heretofore has been manufactured in a small way by Samuel S. Eveland, who controlled the patents under which is was produced and who is connected with the Philadelphia Truck Co., on whose vehicle the system has been one of the principal features, is more than ordinarily simple. It consists essentially of a combination motor and generator, the field of which replaces the flywheel as ordinarily used on automobile engines. This field is direct-connected to the crankshaft of the engine and rotates around the armature, which is anchored stationary. Thus there is no gearing of any nature, and as the speed of the generator is comparatively low, never exceeding the speed of the crankshaft, wear and tear are reduced to a minimum and there is little danger of overheating.

To crank the engine it is merely necessary to press a button, when current from a storage battery converts the generator into a motor for starting purposes. Immediately the engine starts, the motor automatically is converted into a generator and maintains the storage battery in a fully charged condition. By reason of the comparatively large size of the generator, sufficient current is available not only for side lights, head lights and tail lights, but, in the case of a commercial vehicle, also to operate electric advertising signs or novelties, and a hand searchlight for reading the addresses on packages, etc. In addition, current may also be utilized for heating purposes.

Separating Studebaker Vehicles on Coast.

The Studebaker Corporation of America is the title of a new organization which is being formed under the California laws to take over the Studebaker automobile business in that State, which at present is handled by the Studebaker Bros. Co. of California, which latter will continue to handle the Studebaker horse vehicles. Chester N. Weaver, for several years manager of the Studebaker Bros. Co., will relinquish that position on May 1st to assume the management of the new corporation. He will be succeeded by L. F. Weaver, who is at present manager of the Studebaker Bros. Co. Northwest, in Portland, Ore. As the parent Studebaker Corporation has in process of development a full line of motor trucks and delivery wagons, the new California company will be able to present a complete line of motor vehicles of all types

Victor Attracts New Men and Money.

As the result of the internal reorganization which is now in progress, it is extremely probable that very much more will be heard of the Victor truck and the Victor Motor Truck Co., of Buffalo, N. Y. New men and new capital have been interested, among the men being Orson E. Yeager, a wealthy lumberman, who also is the head of the Buffalo Chamber of Commerce and who has become president of the Victor company. Other changes are pending, but Olin L. Neal remains with the company as vice-president, and James G. Budd, formerly with the Alden Sampson organization, will continue as general manager, which post he has filled for the past year.

A new and broader policy will be adopted and in general things will be made to hum. While more attention than ever will be paid to the production of trucks, special efforts will be made in the development of fire department apparatus.

Elmore Establishes Three Branches.

Having taken over the territory which previously was handled on an agency basis, the Elmore Mfg. Co., of Clyde, O., has established factory branches in San Francisco, Los Angeles and Fresno, Cal. R. A. Wood has been appointed manager for the Los Angeles branch and C. W. Hobson manager for the Fresno branch, but A. J. Smith, who will be located at the San Francisco establishment, will have general direction of the Elmore business on the Coast.

Everitt Car Enters Great Britain.

The Everitt car is the latest American production to obtain a foothold in Great Britain. It will be handled by the Everitt-Gascoine Co., at 89 Wigmore street, London, the moving spirit in this company being M. Gascoine, who for many years was the London representative for Armstrong-Whitworth, Ltd.

American Motors Plant to be Enlarged.

The American Motors Co., of Indianapolis, has let contracts for the erection of a three-story brick and concrete addition to its present plant in that city. It will represent a cost of $12,000.

United Rim No. 5 Sees the Light.

The United Rim Co., of Akron, O., has brought out a new rim which already is being shown to the trade. It will be known as United Rim No. 5.

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MILLIONAIRES IN ELECTRIC TRUCKS

Seven of Them Back a New Company Which Arises, Ready for Business—Factory Located in New Jersey.

Without fuss or fireworks, but with the backing of seven men who are described as multi-millionaires, but whose identities have not been disclosed, the Atlantic Vehicle Co., which recently was incorporated under the laws of New Jersey with $390,000 capital stock, had its plans so well laid that it already is in possession of a temporary factory in Newark, N. J., and a commodious general office at 1600 Broadway, New York, with the electric truck which it will manufacture practically ready for production.

The active men in the project are McKinley Boyle, president and treasurer of the company; Ralph Sanger, who is vice-president and sales manager, and M. Black, who is secretary. Arthur J. Slade, one of the most experienced and best known truck designers and engineers in this part of the country, is chief engineer of the Atlantic company, and the trucks which will be produced are of his design. They will comprise vehicles of 1, 2, 3½ and 5-ton capacity, and will sell at from $2,400 to $4,000. The first one has been in actual operation for several months and has given a good account of itself.

The factory at Newark, which ultimately will give way to a larger structure, is located at Oraton street and Verona avenue.

The Atlantic trucks will employ two brand-new motors recently developed by the General Electric Co., which are said to be distinct improvements on anything of the sort available.

McKinley Boyle, the president and treasurer of the new company, is president also of the Continental Car Co., of Lousiville, Ky. Ralph Sanger, the vice-president, was a member of the well-known machinery firm of Wanham, Sanger & Bates.

Grant "Six" Fathered by Grant-Lees.

It finally has been made known that the Grant Motor Car Co., of Cleveland, O., which recently was formed to manufacture the Grant "six," is a direct offshoot of the Grant-Lees Machine Co., of that city, and that it will occupy the immense concrete factory, 100 x 100 feet, which the Grant-Lees people now have in course of erection.

As the Motor World stated three weeks since, H. H. Elmer, former general manager of the Haynes Automobile Co., of Kokomo, Ind., and later one of the organizers of the abandoned Elmer Auto Corporation, of Elkhart, Ind., is president of the Grant Motor Car Co., but it transpires that he has become also vice-president and general manager of the Grant-Lees Machine Co. itself.

The Grant "six" is design of Charles E. Lohr, one of Elmer's colleagues in the Haynes organization, who has become chief engineer of the Grant Motor Car Co. It will be made in one chassis only, and will list at $2,750, fully equipped. Deliveries will commence about the last of the present month.

In addition to Lohr, H. H. Murden, James L. Worthington and E. L. Lawrence, all of whom previously were identified with Elmer, and who are engineers of ability, are associated with him in the Grant enterprise, as previously was stated by the Motor World.

Collapsing Roof Damages New Cole Plant.

Due to the collapse, on Monday last, of a concrete roof of the Cole Motor Car Co.'s new plant in Indianapolis, a carpenter at work on the premises was killed and a money loss of about $5,000 sustained. The building is a four-story structure, of which only the first floor had been completed and occupied. It had not yet been turned over to the Cole company. Work on the building was started last fall, but shortly after the collapse of the Prest-O-Lite company's new plant in October, the Indianapolis authorities ordered all concrete work stopped, and labor on the Cole building ceased. It is believed that the unfinished roof, which was made of cinders, tar and contrete, and which had been left unprotected by tar paper, had become frozen and that consequence of warm weather rendered it unsafe.

Wilkinson Motor Starter Fairly Started.

The Wilkinson Motor Starter Co., which has been in process of formation in Detroit for some time, has completed its organization by the election of Fred Stevenson, president, Benson E. Brown, vice-president and general manager, and R. W. Wagar, secretary and treasurer. The company is capitalized with $50,000, and will market a mechanical starter made under the Wilkinson patents, which are fairly well known in Detroit. It starts the motor by revolving the flywheel, the necessary impetus being given by pressure on a dash pedal. It is so well thought of that it is said three Michigan car manufacturers are having it especially attached to their cars, with a view of adopting it as standard equipment for 1913.

Continental Truck Succeeds Barnsdale.

The Continental Truck Mfg. Co., which succeeded to the business of the Barnsdale Auto Co., of Superior, Wis., has been incorporated with $50,000 capital stock. E. M. Anderson is president and J. G. Barnsdale secretary and treasurer. The 1-ton and 3-ton trucks which the company will produce will be styled Continentals.

London House Takes on American Truck.

While American cars have made great progress in England, American trucks have not kept pace with them, only a comparative few of the better-known brands being in use on the other side. The Schacht motor wagon, however, has just been taken up by the Schneider Motor Co., of London.

OFFICERS RAISED THEIR SALARIES

But Minority Stockholders of Horseless Age Charge It was Illegal and Bring Suit—Old Friends Fall Out.

Samuel B. Stevens, "suing on behalf of himself and on behalf of all of the stockholders of the Horseless Age Co. similarly situated, who may come in and share the expenses of his action," to quote the legal phraseology, has instituted an action in the New York Supreme Court against the Horseless Age Co., Frederick J. Wagner and Charles B. Ames, which in effect is designed to force Wagner and Ames to show legal authority for their action in increasing their respective salaries, as president and vice-president, from $100 per week to $1,000 per month, and to compel them to return to the company all sums in excess of $100 per week which they paid to themselves since October 1, 1910.

While he is not named as a defendant in the action, T. B. Van Alstyne, to whom Wagner, "at the request of Ames," sold a portion of his stock in November last, is more or less directly a party to the litigation. Wagner, who at the time the alleged illegal action was taken, was president of the Horseless Age Co., retired about the first of the year, having sold the remaining portion of his stock to Ames, who then became president and treasurer, Van Alstyne succeeding Ames as vice-president. According to the complaint, the new officials lost no time in "getting busy." Being in control of the company, after electing themselves to their respective offices, they fixed Ames's salary at $12,000 per year and Van Alstyne's at $18,000.

Ames and Wagner are charged with "conspiring together at the expense of the company and its stockholders," and of "diverting and appropriating the company's assets without any right, warrant or authority," and of "fraudulently and wilfully violating their duties as directors of the company."

The special meeting at which they "appropriated to themselves, under the guise or pretense of salary, the sum of $1,000 per month each," is claimed to be illegal in that Stevens, as the third director, was not notified that such a meeting was to be held or was contemplated, and also because their action had not been ratified by either the directors or other stockholders of the company.

It is charged that at none of the meetings held subsequent to their action did Wagner or Ames say anything about having boosted their salaries. At the annual meeting in December last, when Van Alstyne and Ames, who controlled 52 per cent. of the stock, elected themselves to office and voted themselves salaries of $12,000 and $18,000 per year respectively, and despite the objection and protest of

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holders of the remaining 48 per cent. of the stock, Wagner, Ames and Van Alstyne, "acting together, attempted to confirm the aforesaid misappropriation of corporate assets."

Demands for the return of the money having failed of effect, and Van Alstyne and Ames "being in absolute control and hostile to the plaintiffs," Stevens alleges that he had no adequate remedy at law, and therefore asks the court to direct the defendants to return to the corporation "all moneys unlawfully, improperly and fraudulently taken," and for such other relief as the court may deem just and proper.

While the legal phraseology makes it appear that Stevens is alone in instituting the action, it is well known that three other men, prominently identified with the New York automobile trade, who also are stockholders in the Horseless Age Co., are acting with him. Indeed, it is stated that Stevens and his three colleagues furnished practically all of the money when the Horseless Age was purchased in 1909 from its original owner, and that in a spirit of friendship and out of goodness of heart they conveyed to Wagner and Ames the controlling interest. Quite apart from the money involved, they feel that they have been badly treated by those in whom they entrusted such faith, and consider that friendship and goodfellowship have been strained to the breaking point.

Beitler Wants Money Back and Expenses.

Alleging a breach of contract and professing general dissatisfaction with two trucks furnished him for "demonstrating purposes," Jesse J. Beitler has brought suit in the New York Supreme Court against the W. H. McIntyre Co., of Auburn, Ind., for $2,098.49—which sum is said to represent the amounts he paid for the trucks and his own expenses for rent, advertising, etc., while acting as an agent for the McIntyre cars several years ago.

According to the complaint—which in its references to the Selden patent and "licensed" cars, etc., reads like a saga from a long-forgotten past—Jesse J. Beitler was doing a somewhat unprofitable business in New York City under the style Import-Export Motor Co., with headquarters at 1777 Broadway. His contract with the McIntyre company, it is explained, contained the provision that all cars furnished to him for sale in New York were to carry his own name plate, or rather that of the Import-Export company, and that Beitler was not to handle any cars not licensed under patent No. 549,160 (the Selden patent). After Beitler had received two light trucks, paying therefor $1,348 in cash, he claims he found them unsatisfactory, and could not sell them. In addition to the return of the purchase money he believes he is entitled to a refund of all the money spent for rent and office expenses and advertising, and therefore sues for $1,348 plus $751.49, or a total of $2,098.49, besides the usual interest and costs.

HOW GOODYEAR MELON WILL BE CUT

While 100 Per Cent. Stock Dividend Will Be Declared, Not All New Issue Will Be Sold—The Plan.

Further details of the 100 per cent. "melon" which will be cut by the Goodyear Tire & Rubber Co., of Akron, O., in consequence of its increase of capital from $6,000,000 to $15,000,000, which was briefly reported in last week's Motor World, discloses that of the new capital, $10,000,000 will be common and $5,000,000 preferred stock. Only $5,000,000 of the common and $2,000,000 of the preferred will be issued immediately, however, leaving $5,000,000 of the former and $3,000,000 of the latter in the treasury. Of the present capitalization, $2,284,100 of the $2,500,000 common stock is outstanding, and of the $3,500,000 preferred but $1,000,000 is outstanding.

Present holders of the common shares will receive a 100 per cent. common stock dividend and the right to subscribe for $341,800 of new common at par. The old preferred is to be retired at 105, and holders have the right to subscribe for the new preferred share for share at par, after which rights to the new preferred revert to the common stock. The new prferred is 7 per cent. cumulative and is retirable after 1915 at 120. It is not known what rate of dividend the new common will pay, but shareholders anticipate that the present 12 per cent. rate will prevail.

The $5,000,000 common and the $3,000,000 preferred held in the treasury indicate possibilities of other melons in the meantime if conditions justify, the preferred being ample to take care of the further growth of the company.

Goodrich Denies Long Island Purchase.

Published reports that the B. F. Goodrich Co. had purchased a large building site on Jackson and Honeywell avenues, Long Island City, New York, are emphatically denied at the New York office of the Goodrich company. The recent action of the Goodrich company in exchanging its Ohio charter for New York incorporation had given rise to rumors that a factory would be built in New York State, thereby giving apparent color to the reported Long Island City transaction, but Manager Yule, of the Goodrich branch, states that the first the Goodrich people knew of the matter was when it appeared in print.

Nova Scotians Form $2,000,000 Company.

After a more or less extended period of negotiation, the Nova Scotia Carriage Co., of Kentville, N. S., has been taken over by the Nova Scotia Carriage & Motor Car Co., of Amherst, N. S., which was organized for the purpose. The new concern has been incorporated with a capital of $2,000,000, consisting of $750,000 preferred stock, $1,250,000 common stock and an authorized bond issue of $250,000. The bonds and a portion of the stock, totaling $600,000, will be issued to meet present needs and will be expended chiefly in the erection and equipment of a new plant in Amherst, which it is expected will be completed early this fall. The directors of the new company are: M. G. Winters, St. Johns, Newfoundland; N. Curry, Montreal; Hector McInnes; Percy C. Black, president of the Amherst Boot & Shoe Co.; H. W. Wentzell, Halifax; W. B. Tennant, J. W. Regan, Halifax; A. J. Price, Quebec. D. W. McKay, of the Kentville concern, will be the managing director, and his brother, D. C. McKay, will have charge of the sales department.

Wilson Becomes Kelly-Racine's President.

George E. Wilson, former purchasing agent for the Mitchell-Lewis Motor Co., of Racine, Wis., has been elected president and general manager of the Kelly-Racine Rubber Co., of that city, in which the Mitchell-Lewis interests are largely interested. Wilson succeeds Charles F. U. Kelly, who, however, retains close identification with the company which he was instrumental in organizing; he has been made vice-president and henceforth will devote more attention to the sales management than to the more purely executive affairs. Stewart Webster is secretary and treasurer of the company. In addition to these officers, W. M. Lewis and Martin J. Gillen comprise the board of directors.

Clark Causes Excitement in Montpelier.

J. B. Clark, who recently organized the Shelbyville Motor Car Co., in the Indiana town of that name, is seeking to obtain a factory in the nearby town of Montpelier in that State. Clark claims to have more orders in hand than he is able to fill, but he desires the Montpelier folk to subscribe for $10,000 worth of his company's stock, and to provide a factory building free of rent for a prescribed period. Montpelier became sufficiently excited over the prospect to call a meeting of its leading citizens in the city hall, at which the proposal was discussed and a committee appointed to solicit the necessary subscriptions.

More Room for Willard Storage Batteries.

Due to the necessity for more "elbow room," the executive offices of the Willard Storage Battery Co., of Cleveland, O., have been moved to 5760 Euclid avenue. In addition, the Willard company has broken ground for a factory extension, which will add approximately 25,000 square feet to its present facilities.

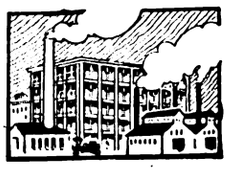
Increases Shown by Franklin Records.

According to the records of the Franklin Automobile Co. of Syracuse, N. Y., the sales of its branch houses already are 144 per cent. in excess of the sales at this time last year. The sales of Franklin dealers for the corresponding period show an improvement of from 100 to 300 per cent.

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THE WEEK'S INCORPORATIONS

Detroit, Mich.—Suburban Motor Car Co., under Michigan laws, with $500,000 capital; to manufacture motor cars.

Chicago, Ill.—Chicago Automobile Trade Association, under Illinois laws. Corporators—N. H. Van Sicklen, Harry N. Fowler, Henry Paulman.

Columbus, O.—Middletown Motor Car Co., under Ohio laws, with $15,000 capital; to deal in motor cars. Corporators—D. N. Gingerick and others.

New Orleans, La.—Cadillac Motor Co., under Louisiana laws, with $20,000 capital; to deal in motor cars. Corporators—C. W. Harrington and others.

Baltimore, Md.—Charter Automobile Co., under Delaware laws, with $75,000 capital; to deal in automobiles. Corporators—C. R. Fouts, W. E. Byrd, G. H. Reinhardt, Baltimore.

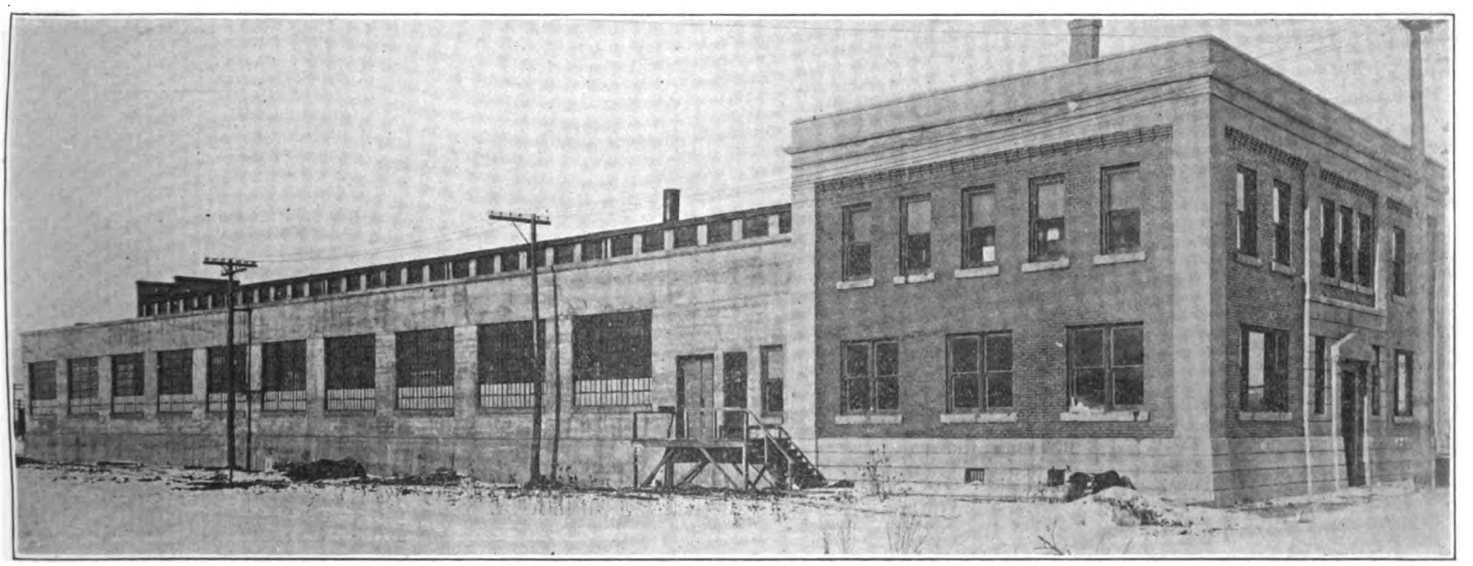
Grand Forks, N. D.—Lyons Auto Co., under North Dakota laws, with $15,000 capital; to deal in motor cars. Corporators—J. W. Lyons, M. J. Lyons, M. M. Jones.

Pasadena, Cal.—Crown City Garage Co., under California laws, with $25,000 capital; to operate a public garage. Corporators—James G. Dickey, Charles L. Wood, Henry Taylor.

Hastings, N. Y.—Post Road Transportation Co., under New York laws, with $100,000 capital; to operate motor busses for hire. Corporators—George T. Brown, Cyrus F. Judson, Paul Hayes.

Milwaukee, Wis.—Sigmund Auto Truck Co., under Wisconsin laws, with $50,000 capital; to manufacture motor trucks. Corporators—Frederick F. Giese, Albert Brandenberg, Robert N. Sessions.

Yonkers, N. Y.—Hudson River Automobile Co., under New York laws, with $500 capital; to deal in motor cars. Corporators—Charles Wieland, Richard Jeggle and Carl Schmeid, all of Yonkers.



WHERE THE BRIGGS-DETROITER CO. PRODUCES DETROITER CARS IN DETROIT

Chicago, Ill.—Pilot Automobile Co., under Illinois laws, with $5,400 capital; to deal in motor cars. Corporators—W. A. Dugane, C. H. Rodenbach, A. E. Pattison.

Victoria, Tex.—Victoria Motor Car Co., under Texas laws, with $5,000 capital; to deal in motor cars. Corporators—Welder Daniel, J. T. Linebaugh, W. H. Craine.

Biddeford, Me.—Etchelle Auto Co., under Maine laws, with $10,000 capital; to deal in motor cars. Corporators—Joseph Etchelle, Charles V. Tanner, Arthur L. Roberts.

Cleveland, O.—B. N. C. Motor Truck Co., under Ohio laws, with $5,000 capital; to deal in motor trucks. Corporators—R. A. Wilbur, A. S. Dole, H. H. Coyne and others.

Yonkers, N. Y.—Yonkers Auto Service Co., under New York laws, with $2,000 capital; to operate a garage. Corporators—George Fry, Edward Keale, F. P. Hoffman.

Chicago, Ill.—Star Motor Delivery Co., under Illinois laws, with $75,000 capital; to do a general delivery business. Corporators—James E. Hauronic, F. R. Buri, Frank P. Paige.

Milwaukee, Wis.—Wisconsin Retail Automobile Dealers' Association, under Wisconsin laws. Corporators—Nathan Haessley, T. J. Edwards, L. F. Schoelkopf and U. C. Moore.

East Aurora, N. Y.—East Aurora Motor Car Co., under New York laws, with $8,000 capital; to deal in motor cars. Corporators—Arthur L. Pierce, Manley B. Paxon, Winfield S. Wilson.

Jennings, La.—Jennings Garage & Machine Shop, under Louisiana laws, with $25,000 capital; to operate a garage and repair shop. Corporators—S. J. Johnson, S. K. Johnson and others.

Chicago, Ill.—Illinois Motor Patents Corporation, under Illinois laws, with $5,000 capital; to manufacture motor cars and parts. Corporators—William D. Kirk, Edward C. Marsh, George E. Daniels.

Buffalo, N. Y.—Eadie Vehicle & Gear Co., under New York laws, with $200,000 capital; to manufacture motor cars and parts. Corporators—John M. Eadie, George P. Keating, Seward H. Millener, all of Buffalo.

Utica, N. Y.—Bauer-Jackson Auto Co., under New York laws, with $2,000 capital; to deal in motor cars. Corporators—Walter C. Bauer, 31 Oneida street; Foster G. Jackson, George H. Jackson, both of 14 Maple street.

New Rochelle, N. Y.—Cedar Auto and Marine Co., under New York laws, with $2,500 capital; to operate a garage and machine shop. Corporators — Fernell D.

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Franckling, Charles A. McGill, Albert B. McGill.

Dover, Del.—Motor Vehicle Speed Alarm Co., under Delaware laws, with $500,000 capital; to manufacture automobile accessories. Corporators—H. O. Coughlan, J. F. Curtain, New York City; J. M. Saterfield, Dover.

New York, N. Y.—Royal Motor Truck Co. of New York, under New York laws, with $10,000 capital; to deal in motor trucks. Corporators—Arthur J. Cohen, William S. Weiss, Harry J. Leffert, all of 45 Wall street.

New York, N. Y.—E. D. Gear Co., under New York laws, with $60,000 capital; to manufacture gears, etc. Corporators—Daniel J. Rice, 149 West 35th street; James P. Eadie, 141 Ninth avenue; George Keating, 287 Broadway.

Cleveland, Ohio—D. H. Hutchcroft & Sons Co., under Ohio laws, with $10,000 capital; to deal in automobiles. Corporators—D. H. Hutchcroft, Glidden W. Hutchcroft, Thornton Hutchcroft, William Merts and S. H. Meacham.

New York, N. Y.—Elsmere Cab & Car Co., under New York laws, with $1,000 capital; to conduct an automobile livery business. Corporators—Eleanor Engledrum, Mary E. Morgan and John Engledrum, all of 789 Elsmere place.

Middletown, Conn.—Tucker Garage Co., under Connecticut laws, with $50,000 capital; to operate a public garage and deal in automobiles. Corporators—Willard D. Tucker, G. Howard Tuttle, Clare H. Blatchley, all of Middletown.

Albany, N. Y.—Kingsbury-Leahy Co., under New York laws, with $40,000 capital; to manufacture vehicles. Corporators—Edward W. Leahy, 9 LaFayette street; Jacob S. Kingsbury and Sarah M. Kingsbury, both of 4 Jay street.

New York, N. Y.—National Tire Co., under New York laws, with $50,000 capital; to deal in automobile tires. Corporators—Harry Davies, 246 West 46th street; Thos. H. Hopkirk, 30 Church street; Ivan W. Weisbrod, St. George, S. I.

New York, N. Y.—Sullivan Garage Co., under New York laws, with $15,000 capital; to operate a public garage. Corporators—M. E. MacAdam, 92 Morningside avenue; John N. MacAdam and Peter B. Riley, both of 121 West 42d street.

Little Rock, Ark.—Puncture-Proof Tire & Wheel Co., under Arkansas laws, with $25,000 capital; to manufacture automobile tires and wheels. Corporators—R. B. Sutton, F. L. White, R. W. Griffith, O. D. Longstreth and John Farmer.

Wilmington, Del.—Non-Skid Chain Co., under Delaware laws, with $250,000 capital; to manufacture anti-skid devices. Corporators—A. C. Platt, E. Van Etten, Edward E. Johnstone, W. J. Arkell, New York City; H. W. Davis, Wilmington.

Parkersburg, W. Va.—Logan Carriage & Automobile Co., under West Virginia laws, with $25,000 capital; to build carriages and automobiles. Corporators—Henry Logan, Thomas Paige, Henry Huffman, Herman Dills, B. F. Stout, all of Parkersburg.

Brooklyn, N. Y.—D. S. P. Automobile Specialty Co., under New York laws, with $5,000 capital; to deal in automobile specialties. Corporators—Chas. F. Sendall, 63 Kingston avenue; William Price, 286 Fulton street; George Sendall, 957 57th street.

Brooklyn, N. Y.—Eureka Non-Skid Manufacturing Co., under New York laws, with $2,500 capital; to manufacture anti-skid devices. Corporators—Henry E. Bradford, East Williston; James Colburn, London, England; Brown Holston, Plainfield, N. J.

New York, N. Y.—Amsterdam Starter Co., under New York laws, with $5,000 capital; to manufacture engine starters. Corporators—Edwin S. Greene, 19 Manhattan avenue; Rufus L. Weaver, 115 Broadway; Sarah S. Weaver, 651 West 179th street.

New York, N. Y.—Eclipse Rubber & Tire Co., under New York laws, with $50,000 capital; to deal in tires, etc. Corporators—Simon J. Schwartz, 347 Fifth avenue; Arthur A. Glass, 301 West 108th street; Harry A. Bloomberg, 5 Beekman street.

New York, N. Y.—Combination Transmission Clutch Co., under New York laws, with $10,000 capital; to manufacture an automobile transmission system. Corporators—Louis Romeisler and George Isaken, of 135 Broadway, and Herman Gustow, 235 Broadway.

Yonkers, N. Y.—Yonkers Auto Service Co., Inc., under New York laws, with $2,000 capital; to manufacture automobiles. Corporators—George G. Frey, Mamaroneck; Frank P. Hoffman, 25 Broad street, New York City; Edward Keale, 202 Patchen avenue, Brooklyn.

New York, N. Y.—Eighteenth Street Garage Co., under New York laws, with $5,000 capital; to operate a public garage. Corporators—William F. Donnelly, 407 W. 22nd street; Daniel E. Peel, 360 W. 21st street; Abraham E. Magnus, 836 Jefferson avenue, Brooklyn.

New York, N. Y.—R. A. S. Spring and Bumper Co., Inc., under New York laws, with $1,000 capital; to manufacture automobile accessories. Corporators—George Steller, 56 Gold street; Victor H. Anderson, 251 Fourth avenue; George Pinkenberger, 12 East 42d street.

New York, N. Y.—Auto Truck Storage & Exchange Co., under New York laws, with $20,000 capital; to operate a garage and exchange business. Corporators—Henry J. Benjamin, 55 West 73d street; Louis H. Moos, 501 West 110th street; Leopold O. Rothschield, 251 West 138th street.

New York, N. Y.—Mitchell-Edmonston Garage, Inc., under New York laws, with $10,000 capital; to operate a public garage. Corporators—Leland A. Mitchell, 9 Fort Washington avenue; George W. Edmonston, 460 Bloomfield avenue; Joseph P. Bickerton, Jr., 104 West 70th street.

Changes Among Prominent Tradesmen.

John W. Bate, for many years superintendent of the Mitchell-Lewis Motor Co., of Racine, Wis., has resigned that office. He, however, remains a director of the company.

W. H. Hunt, former manager of the San Francisco branch of the Goodyear Tire & Rubber Co., has joined the Franklin Automobile Co. in that city; he will be attached to the sales department.

W. G. Johnson has been appointed chief engineer for the Garford Co., of Elyria, O. He succeeds C. A. Neracher, who resigned to join the engineering staff of the Willys-Overland Co., of Toledo.

A. J. Rogers, heretofore identified with the sales department of the Remy Electric Co., of Anderson, Ind., has been transferred to the management of the Remy branch in San Francisco. He will have general direction of the Remy business on the Pacific Coast.

E. F. Lake has been appointed laboratory manager for the Perfection Spring Co., of Cleveland, O. Lake at one time was one of the editors of the American Machinist, but more recently has been conducting a consulting metallurgical business on his own account.

T. A. Peck has been appointed manager of the Metzger Motor Car Co.'s technical department in Detroit. Although he received his training in the Brown & Sharpe works, in Providence, R. I., Peck has been connected with the mechanical end of the automobile industry almost since its inception.

R. S. Bryant has been appointed consulting engineer of the Standard Welding Co., of Cleveland, O. He previously was identified with the Bryant Rim Co., of Columbus, O., in a capacity which carries with it the knowledge and experience necessary to measure up to the Standard Welding's high standard.

The office and salesroom of the American Locomotive Co., at 1886 Broadway, New York, having been designated an Alco branch, A. D. Frost has been appointed its manager. He previously was connected with the establishment as manager of local sales. In his new capacity, Frost will have charge also of the Alco service building in Long Island City.

William McGlashan, for many years designing engineer for the Winton Motor Carriage Co., of Cleveland, O., has resigned to become chief engineer for the Studebaker Corporation at the latter's South Bend (Ind.) factory. As heretofore, practically all of the Studebaker automobile work has been performed at the Detroit factory. McGlashan's appointment to the post of chief engineer may or may not be significant.

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Knute Knudson has opened a garage in Delhi, Minn.

Wind Bros. have opened a garage in New London, Iowa.

I. C. Devis and W. T. Stolt are building a garage in Corsica, S. D.

Naegeli Brothers are building a garage and repair shop in Fairdale, N. D.

Chelsea, Mich., will soon have a modern garage. L. G. Palmer is building it.

J. C. Hanford is preparing to open a garage in Colfax, Wash. He has the agency for Cadillac cars.

Louis Medalen, of Lake Johanna, Minn., is preparing to open a garage in Belgrade, in the same State.

William Ness and Albert Johnson have formed a partnership and opened a garage in Zumbrota, Minn.

At a cost of $14,000, a cement garage is

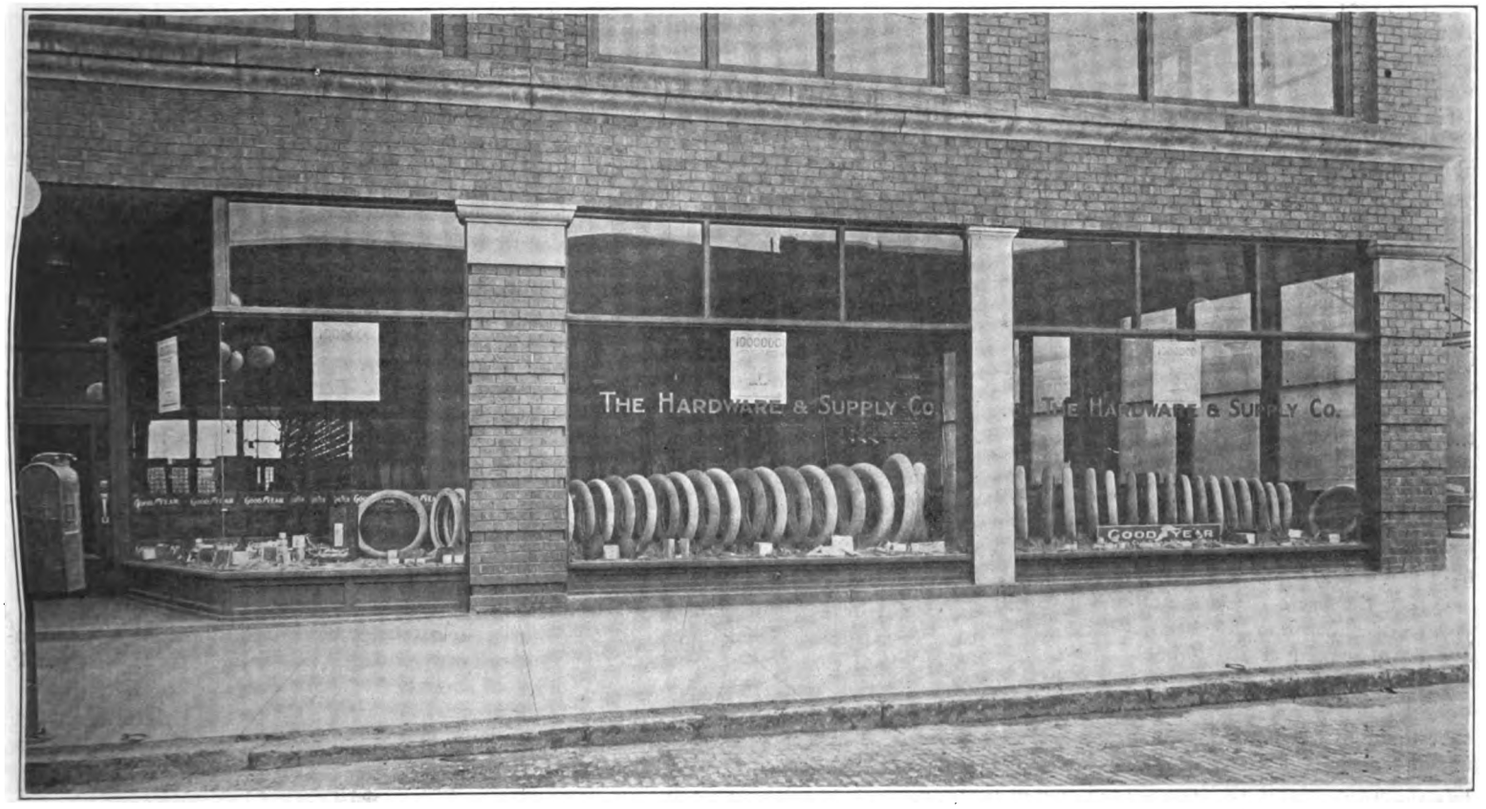
a salesroom in Burlington, Iowa, where they will handle the Michigan car.

John Grandy and Cliff O'Hara have rented the Craig building, in Bathgate, N. D., and opened a garage and repair shop therein.

Malcolm P. Burbank has opened a garage and salesroom at 805 Main street, Worcester, Mass., where he will show Pullman cars.

The Lake Shore Tire Co., of Sheboygan,

EVIDENCE THAT TIRES CAN BE DISPLAYED TO ADVANTAGE IN A SHOW WINDOW



The display in an Akron show window is made up of 43 Goodyear tires of both the non-skid and the plain tread type, ranging in size from 44 x 5½ to 28 x 3. The arrangement of the tires, laid on a bed of sea green muslin, is a reproduction of a recent advertisement of the Goodyear Tire and Rubber Co. entitled "The Floodlike Advance."

Charles Bryant and A. S. Stapleton are building a garage in Virginia, Mont.

J. H. Zander and Herman Krueger are building a garage in Browntown, Minn.

W. W. Savage has engaged in the automobile repair business in Janesville, Minn.

G. E. Loeffelbein is preparing to open an automobile livery and garage in Martin, N. D.

F. T. Bolton has opened a repair shop and garage at 125 Sixteenth street, Portland, Ore.

At a cost of $12,000, Samuel Foster is building a garage at 720 Barr street, Fort Wayne, Ind.

being built in Mulvane, Kans. It will be occupied by Bert Snively.

S. L. Pemberton is making ready to build a garage at the corner of Oak and Nebraska avenue, Tampa, Fla.

M. P. Carpenter has formed a partnership with A. Rossi and is building a garage and machine shop in Divon, Cal.

Will Evans has purchased the Sedalia Auto Garage, in Sedalia, Mo., from W. H. Highleyman, the former owner.

The Economy Auto Co., agent for Cole cars in Oskaloosa, Iowa, has changed its name to W. M. Novak Auto Co.

Dr. Madison and H. Cameron have opened

Wis., has changed hands. A. M. Schuerle, the former owner, has sold out to Joseph Arle.

Walter B. Sheldon believes that Red Wing, Minn., needs a modern garage, and is building one on Main street to supply the deficiency.

E. W. Hill has taken over the agency business of the White Motor Car Co., of Portland, Ore. He will handle White cars in the whole State.

William Cappis has sold a half interest in his garage at Blair, Neb., to Louis Latta. The new firm will do business under the style Blair Auto Co.

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An electric garage, salesroom and service station for Lansden electric trucks has been opened in Chicago at 1000 Michigan avenue. C. P. Jaeger is manager.

Henry Putnam has purchased the livery business of Holger Mortisen in Penfield, Ill. He will add automobiles to the business and conduct a garage.

C. L. Landis, formerly with the Esterline Co., Lafayette, Ind., has purchased a half interest in the Fashion Garage & Automobile Co., in Indianapolis.

W. D. Saywer and G. C. Whitemore have formed the Taxicab Service Corporation in Portland, Me. A garage is being erected for them on Spring street.

The Stevens-Duryea Co., of Chicopee Falls, has established a retail branch in Hartford, Conn. It will be under the management of M. H. Parsons.

J. J. Hayes, in Chisholm, Minn., has commenced business in temporary quarters pending the completion of a garage for which plans have been drawn.

F. D. Davis has opened an automobile salesroom at 772 West Walnut street, Springfield, Mo. He will handle the Metz runabout in the Ozark country.

The Vesta Motor Car Co. has opened a service building on Baum street, Pittsburgh, Pa., where it will care for the needs of Stevens-Duryea and Velie owners.

J. E. Chapman and Robert H. Love have formed the Chapman-Love Motor Car Co. and opened a salesroom at 1509 Fourteenth street, Washington, D. C. They will handle the King car.

The North Garey Garage, in Pomona, Cal., has been sold to F. C. Howland, of Pasadena. The sale carries with it the agency for Studebaker, E-F-M and Flanders cars.

Under the style of Automobile Clearing House, a salesroom for second-hand cars has been opened at 20 Wabash street, Indianapolis, Ind. E. J. Kane is the head of the enterprise.

William S. Lewis, of Eastman, Ga., trading under the style of Eastman Garage Co., has filed a voluntary petition in bankruptcy. He places his assets at $893.51 and his liabilities at $2,222.70.

Henry Luhrmann has purchased the real estate and agency contracts of the Imperial Motor Car Co., on Walnut Hills, Cincinnati, Ohio. The Imperial company has a capitalization of $150,000.

W. A. Griffing, who formerly handled motorcycles in Spokane, Wash., has gone into the automobile business and opened a garage in Missoula, Mont. He has the agency for Metz runabouts.

The Central Motor Sales Co. is the style of a new concern which just has "opened up" at 815 Sycamore street, Cincinnati, O., with T. A. Perkins as manager. Brush cars are to be handled exclusively.

The Automobile Owners' Supply Co., of Washington, D. C., is now on the way to become a mere memory. The receivers have been authorized to sell the assets of the company to the best advantage.

The Taylor Motor Car Co. has been formed by John Taylor, in Pittsburgh, Pa., to distribute Lippard-Stewart commercial cars in Western Pennsylvania. Its headquarters are at 7125 Kelley street.

E. H. Lambert, for many years connected with the Franklin agency in San Francisco, Cal., has gone into business on his own account and opened a garage and repair shop at 1420 21st street, Sacramento.

Clyde F. Sandt, of Martin's Creek, Pa., has opened salesrooms at the Imperial Garage, 51 North Sitgreaves street, Easton, Pa. He has the agency for the Overland, Maxwell, Columbia, Brush and Metz cars.

The Marietta Motor Co., of the Ohio city of that name, has purchased the Al Anderson Garage in the same city. The consolidated business will be located at the old Anderson garage, on Front street.

The Viehman Auto Co. has been organized in Minneapolis, Minn., for the distribution of Auburn cars in Minnesota, Wisconsin and North and South Dakota. Salesrooms have been opened at 311 Third street South.

The International Harvester Co. has leased a two-story building at 1814-1816 Michigan avenue, Chicago, for a period of ten years. The premises will be used as display rooms for the trucks and delivery wagons made by the I. H. C.

The Matheson Motor Co. of Washington has been organized in the national capital to handle Matheson cars, and has opened showrooms in the Masonic Temple. Edmund K. Fox is president and Ernest H. Coolidge, manager, of the company.

The A. F. Kelsey Garage, in Shelbyville, Ind., which recently went into the hands of a receiver, has been purchased by John F. Day and Charles E. Arnold. They will continue the business under a new name, which has not yet been decided upon.

The Cedar Auto & Marine Co. has been formed in New Rochelle, N. Y., with Feuncll D. Franklin, of New York City, as president. A large fire-proof garage is being erected for the company in Cedar road and will be ready for occupancy on May 1.

The North Garey Garage, in Pomona, Cal., has changed hands, F. C. Howland taking over the business from E. W. Davies. The title of the establishment also was changed to Studebaker Garage. As the name implies, Studebaker cars will be sold exclusively.

Charles J. Parker and Alex Robertson have purchased the Western Motor Supply Co., 1018 Nicollet avenue, Minneapolis, Minn. Parker is manager also of the Tri-State Rubber Co., distributor of Swinehart tires, and will merge the rubber with the supply company.

L. D. McCarthy, distributor of Rambler cars in Spokane, Wash., has opened a branch in Walla Walla, where he will do business under the style of the L. D. McCarthy Automobile Co., of Spokane. The salesrooms are located at 105 Fourth street and are under the management of W. H. Wierman.

The Bowler Motor Car Co., which has the Cole agency in San Diego, Cal., has been reorganized and henceforth will be known as the Cole Automobile Co. Simultaneously with the change of name, the selesrooms of the company have been transferred to the property adjoining the Spreckels Theater building.

The Jandorf Automobile Co., successor to the Broadway Auto Exchange, has opened new showrooms at 42-44 West Sixty-second street, New York City, utilizing the old showrooms at 1761 Broadway for the display of bodies and tires. The factory and service department remains at Eleventh avenue and 58th street.

The Auto Livery Co. has been formed in Coffeyville, Kan., with E. L. Robinson, of the Robinson Packer Co., and Culbert Mason, of the Mason Auto Livery Service, as the moving spirits. The new company purposes to operate a general motor livery and renting service, with headquarters at the plant of the Robinson Packer Co.

Recent Losses by Fire.

Thorndale, Tex.—Thorndale Garage destroyed. Loss, $5,000.

Chicago, Ill.—Oak Park Taxicab Co.'s garage and five cars burned. Loss, $8,000.

Detroit, Mich.—Detroit Auto Garage, 68-70 Adams avenue, West, gutted. Loss, $35,000.

St. Paul, Minn.—C. W. Gordon's garage, 378 Summit street, and two automobiles burned. Loss, $7,000.

Mansfield, La.—Hernden Garage completely destroyed. Loss heavy; only partly covered by insurance.

Alpena, Mich.—Andrew Hanson's garage, on Washington avenue, destroyed. Loss, $1,500; covered by insurance.

Chicago, Ill.—Beckley-Ralston Co.'s sales room (automobile supplies), at 1428 Michigan avenue, destroyed. Loss, $5,000.

Increases and Decreases of Capital.

Chicago, Ill.—F. A. L. Auto Co., from $2,500 to $20,000.

Pittsburgh, Pa.—National Tube Co., from $9,000,000 to $13,000,000.

Wabash, Ind.—Service Motor Car Co., from $500,000 to $125,000.

Chicago, Ill.—Boulevard Motor Delivery Co., from $2,500 to $10,000.

Detroit, Mich.—Sewell Cushion Wheel Co., from $60,000 to $300,000.

Muskegon, Mich.—Muskegon Motor Specialty Co., from $30,000 to $100,000.

Philadelphia, Pa.—Standard Roller Bearing Co., from $5,000,000 to $8,000,000.

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THE MOTOR WORLD

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BEKNIGHTED VIEWS OF THE MOTOR STARTER.

Indications make it appear that the British idea of the motor starter is that its sole purpose is to eliminate the muscular effort required to start the motor, and that there is no particular reason for its use on a car driven by a chauffeur, because he is paid to work, or on a car driven by its owner, unless the owner is of a lazy disposition and objects to the "labour" involved.

That sometime American, Charles Y. Knight, who has learned to tickle the British fancy, encouraged the notion on the occasion of his recent return to London. He was interviewed, of course, and among other things American that were damned by faint praise was the motor starter. According to Mr. Knight it is popular here because such a large percentage of owners drive their own cars, because we are supplied with lower grades of gasolene, because our colder weather makes cranking difficult, because the average horsepower of our engines is much higher than those in use abroad, and so forth and so on, ad naus.

Perhaps these things were influential in popularizing the motor starter in this country, but any foreigner who believes that they represent the sum total of its advantages is either uncommonly short-sighted or is easily lulled to sleep. It may be true that desire to promote personal convenience by eliminating muscular labor was behind the first desire that gave us the device that permits starting the engine from the seat, but so many other and greater benefits have been found that the element of convenience has been, or soon will be, almost lost sight of. It prevents the fractured arms and sprained wrists that come of the deadly back-kick, and the even more serious results that come of cranking with gears in mesh; and these misfortunes are not restricted to America, and they are as painful and as expensive when inflicted by a car of 10 horsepower as by one of ten times that power, and whether the humble chauffeur or the lordly owner be the sufferer. In England, as in America, it is necessary to step into the street or road to crank a motor, and streets and roads are not always dry nor the skies untearful, nor are stalled motors in congested places or dangerous places unknown abroad; and presumably there as here anything that serves to make the motor car more "tractable" to womankind is to be encouraged; and among its many other virtues, the engine starter serves that purpose as nothing else can serve it.

Our English friends should undeceive themselves and cease to pander to their prejudices and to flatter their fancies. The engine starter is bound to attain universal use and they may as well join the march of progress and assist in its perfection.

SUPPORTING A CAR ON "NEXT TO NOTHING."

Periodically, some one or other attempts to show how it is possible to support an automobile on "next to nothing"—how a person with an income of $1,800 or $2,000 can maintain an automobile without, to employ the vernacular, "going broke." Whether or not these things are good for the industry or good for the man of moderate means is an open question. Certainly, before such figures and assertions are accepted at their face value they at least should be scrutinized carefully and pondered deeply.

The salaried man with an income of, say, $1,800 a year may be able to support a car without unduly straining his resources, but to do so every condition must be favorable. For instance, he must reside in a small city where rents are comparatively low, his garage must be his own property and he must drive the car himself; also he must be competent to care for the car—to make minor repairs and adjustments, etc. Then, if he has luck with his tires and other things, and if he has facilities for storing gasolene and lubricating oil, so that he can purchase them at quantity prices, it is quite conceivable that he can live within his income and drive his car very nearly as far as he has a mind to. But to suggest that a man with an $1,800 or $2,000 income can support a car in a large city like New York or Chicago, where garage charges and everything else come high, smacks of encouraging the sort of folly that leads to ruin and makes food for sensational newspapers.

Even assuming that the $1,800 man had been presented with his car, few compilers go so far as to present him with insurance also, and without it one bad accident would make a big hole in anyone's $1,800. The question is not whether a car can be maintained on $1,800 or $2,000 a year, but rather how it can be done. and though the odds are very much against a credit instead of a debit showing on the books of those who attempt it in a large city, where dependence must be placed on public garages, it is quite within reason that a mechanically inclined man without a mania for speed, can support a car without going bankrupt, on even $1,800 a year, provided he is his own driver and garage man and middleman in the purchase of supplies, and provided, also, that no one or nothing else is dependent on him for support. Indeed, so many provisos and ifs and other qualifications enter into the subject that for the general good it best had be left alone.

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TIRE PRICES AND THEIR TROUBLES

New York Dealer Discusses Subject and Places Blame on Manufacturers—"Wildcatters" Who Promote Cutting.

"It may be that the list price of tires has constituted a huge joke—in fact, there is not very much doubt about it; but it does seem to me, now that they have been reduced, that the joke is being made too funny when the manufacturers endeavor to prove to jobbers and dealers that the reduction will permit them—that is, the jobbers and dealers—to make more money than ever before," was the rather caustic criticism of a New York dealer who has been identified with the tire trade for many years, and whose views regarding the price situation were sought.

"The tire makers have reduced prices and raised them, only to reduce them again, and always the reduction has meant less money for the jobber and dealer, despite the fact that, as in the present instance, we are asked to believe that such reductions are designed to check price-cutting and thereby enable us to increase our earnings. Some of us at least have cut our eyeteeth, and we decline to accept such professions at their face value; we believe we have ample justification for doing so.

"Perhaps the tire manufacturers have meant well, but it seems as if their prices have been made only to be cut, and conditions are such that no price they now may name will serve any other purpose. I cannot recall a time during recent years when any car owner, who was not sound asleep, paid full price for his tires. The price cuts have been horizontal, and vertical, and of every other sort; in fact, prices have been simply cut to ribbons. Manufacturers know it as well as anyone else, but pinching our discounts close behind the ears will not serve greatly to clarify the situation. The new prices already have been cut as freely as the old ones, and they will be cut again so long as the tire manufacturers continue their present policy of giving trade discounts to anyone who brings a letterhead or a business card to prove that he is a dealer or a jobber. Perhaps they cannot stop the cutting, but the practices of many of the tire manufacturers themselves are not above suspicion and criticism, and it seems to me that the present is a pretty good time for plainly speaking on that score.

"It is a fact, and one that is susceptible of easy proof, that a business card or a letterhead is practically all that is necessary for any man to secure trade discounts, and when I say 'trade discounts' I mean the preferred quotations. It is not so long ago that those of us who are doing a legitimate business were assured by at least some of the bigwigs in the tire trade that preferred discounts would be accorded only to a certain number of dealers and jobbers whose standing was beyond question. In New York, if I remember rightly, the number was fifty-nine. Apparently, however, these assurances soon were forgotten, and it has appeared as if the owner of a mere hole in the wall is not too small to be denied these figures. No one seems to have had any great trouble in getting them, and the tremendous multiplication of tire dealers and tire jobbers and the consequent wholesale slashing of prices are the direct results of that policy.

"I know one chap, a ne'er-do-well, who went into the tire business with a capital of $35. He hired a hole in the wall, printed a letterhead and hung out a sign proclaiming that he was in the business of selling and repairing tires; and, although he had not more than three sticks of furniture in the place, he secured the preferred prices, apparently, without quibble and without question. With his capital in hand he purchased one tire, sold it at a good profit, and turned over the money to such good purpose that at the end of three months he had cleared more than $700. The sales were made at a cut price—he could do business in no other way—and he never repaired a tire in the course of his existence. All the jobs of that sort which he secured he sent out and had performed by such people as ourselves, who maintain repairing and vulcanizing plants. Although on the road to at least modest riches, the ne'er-do-well's habits were too strong, and he fell back again into his old ways, and his money and his 'tire business' went with him.

"There are several chauffeurs who have embarked in the tire business in about the same way. They paid $20 or so for a vulcanizer, printed a letterhead and set up in business. By sharing their discounts with other chauffeurs—at the car owner's expense—they have swollen their incomes to proportions of which they once dared not dream.

"In some cases not even a hole in the wall or a cheap vulcanizer is necessary to secure the discounts. There is one shrewd individual, located in one of the much-peopled buildings within sight of Central Park, whose only visible asset is a desk, occupying part of an office with other desks. He calls himself a company, however, and possesses a letterhead, and he, too, is considered in the tire business and is accorded the preferred figures. His expenses are practically nothing and he carries no stock whatever; indeed, he has no place to carry stock. All he does is to purchase tires from the manufacturers' branches and deliver them when he obtains an order. I understand, and I have every reason to believe it is a fact, that, while he gets more when he can do so, this alleged 'company' is satisfied with a margin of 2½ per cent. profit.

"These are no dreams; they are actualities; and when such conditions exist, and when they are to blame for them, how can the tire manufacturers expect to lessen price cutting, much less stop it? They actually force those of us who are doing a legitimate business to compete with such people. Why should we turn anyone from our doors, when we know that the chances are strong that they will get what they want from the 'wildcatters,' who have grown up by grace of the tire manufacturers themselves?

"Of course, the latter will maintain that they cannot control the price of an unpatented article, but they hardly dare say that they cannot require that certain conditions be fulfilled before granting their best discounts. They all seem fearful that somehow some small portion of the business will get away from them, and they act accordingly, and then protest more or less conscientiously when people situated as we are similarly decline to turn trade from our doors.

"We have a considerable establishment to maintain and a considerable payroll to meet; we always have on hand several thousands of dollars worth of tires; we run a repair and vulcanizing plant that is second to none, and yet in the eyes of the tire manufacturer, apparently, we are no better than the man who merely has a letterhead, a hole in the wall, and who can do business on next to nothing. While the tire manufacturers are seeking to place the blame for existing conditions, they should look in the mirror and place much of the blame where properly it belongs—on themselves."



April 15-20, Birmingham, Ala.—Track races under the auspices of the Birmingham Automobile Dealers' Association.

April 22, Haverhill, Mass.—Haverhill Automobile Dealers' first show.

April 27, Philadelphia, Pa.—Quaker City Motor Club's Roadability run from Philadelphia to Atlantic City

April 29-May 4, Burlington, Vt.—Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal.—Santa Monica road race.

May 15-18, Chicago, Ill—Chicago Motor Club's reliability run for commercial vehicles.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

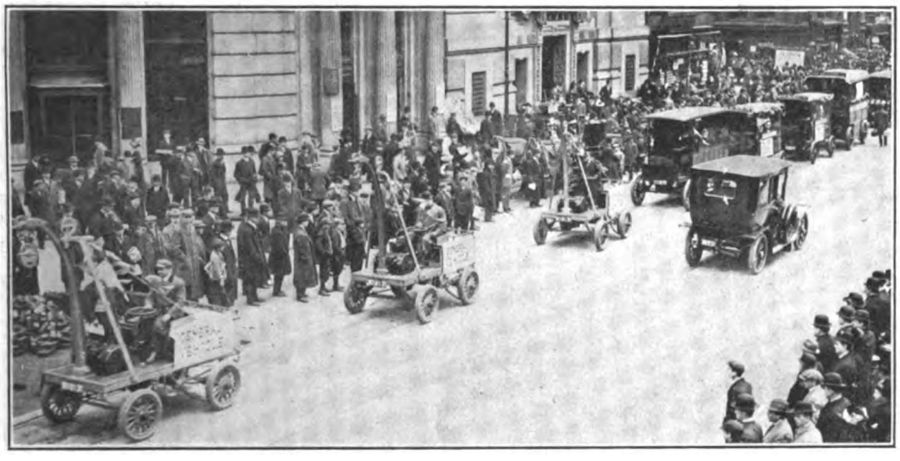
June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contets on Algonquin Hill.

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TRAFFIC HINDERED TRUCK PARADE

New York's Turnout Proves Better Than First Effort but Still Lacking—Splendid Contrast of Types.

Just as the word "turnout" fitted the rather disjointed procession of motor trucks which a year ago about this time chugged its way up and down Broadway and Fifth avenue better than the word "parade," which was the official designation given the function by its sponsors—the Motor Truck Club, of New York City—so it fitted on Saturday, 13th inst., when the second annual "parade" wended its way from Battery Park by a more or less devious route to 125th street and Broadway, where the trucks were dispersed.



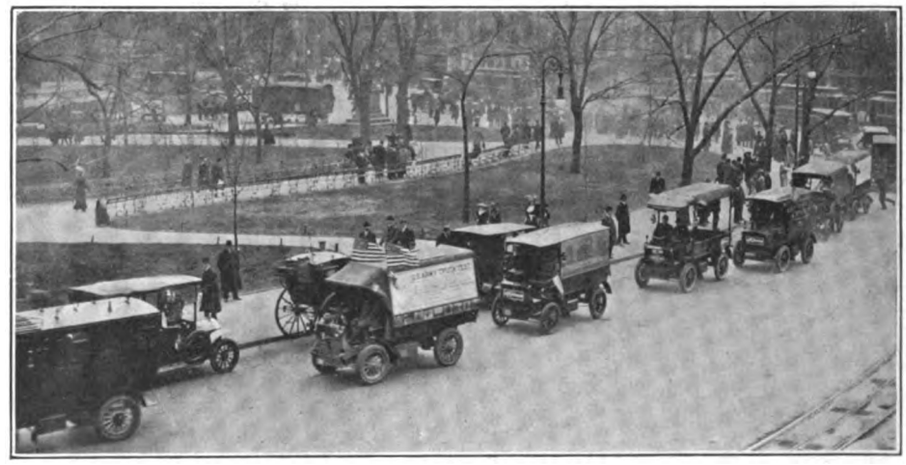
GENERAL VEHICLE BATTERY CRANE TRUCKS THAT DREW ATTENTION

In other respects it resembled its prototype of a year ago, too. Though the weather was not quite so bad as it was for the first parade, dark clouds obscured the sun and the weather man threatened "local showers," which perhaps accounts for the slim crowd that ceased its toil long enough to watch the procession. In fact, it did sprinkle a little bit, though not enough to cause the official band, ensconced on the hurricane deck of a Fifth avenue bus, to seek shelter inside, as it was compelled to do last year. Down at Battery Park and on lower Broadway, where the procession started—it was scheduled to move at 1:30 p. m., but failed to get under "weigh" until 2:30—a fair-sized crowd lined the curbs and watched the big trucks and little trucks and medium-sized trucks move off toward their destination. As the procession rolled uptown, however, the crowds grew steadily slimmer, until even at 50th street and Broadway, which was about two-thirds of the whole distance traveled, the knots of spectators which gathered here and there on the sidewalks could hardly be called crowds, individually, or a crowd collectively. The streets were not cleared for the paraders, and when they mingled with the dense traffic on Fifth avenue the procession became disjointed, if not disorganized, and was lost in the maze, so to speak.

According to the plans of those to whom was allotted the routing, the procession was supposed to proceed directly up Broadway to 125th street, except that a slight detour, around what has been styled the "matinee district," would take the trucks off the White Way for a few blocks. The line of march, therefore, led up Broadway to 22nd street, where the trucks were switched over to Fourth avenue for a short run up to 27th street, and then through to Fifth avenue. From there the procession was steered to 48th street and through to Broadway again.

And there were plenty of places that were not good locations from which to view the procession. Contrary to the expectations of those who gathered there, and also contrary to the route as originally mapped out, Broadway and 48th street was one of those locations. The advance of the procession reached there about 4 o'clock, and all went well for about fifteen or twenty minutes, or until approximately 100 trucks had passed. Then there was a cessation of activities, and it was supposed that the whole number of trucks had passed. Which lends point to the assertion that few had heard anything about the "parade." At any rate, those who had foregathered went their way, and it was not until several minutes later that the procession was noticed going through other streets—any other street than 48th, it seemed—and regaining Broadway above 50th street. Eventually the stream was turned back into 48th street, but those who waited there missed quite half of it.

In respect to strength of numbers, the procession was considerably larger than last year's. Whereas only some 200 trucks formed in line last April, on Saturday the number by actual count was 344. Following the general rule of the previous event, the trucks were formed in line at the Battery in alphabetical order, according to their trade names. But, as was the case last year, they did not remain in that order for a very great length of time, and the further uptown the procession got the harder it became to determine exactly where the ordinary everyday traffic left off and the "parade" began, or vice versa. When the same trouble was encountered last year it was planned to overcome it this year by instructing the drivers to "stick together"—to wait for each other—but the traffic regulations played havoc with the line, and the instinct to "beat it" was just as strong in the breasts of some as it was a year ago. In fact, nearly all the drivers seemed bent on covering the course in the shortest possible space of time, and it was suggested that some of the trucks must have had their speed-governing devices temporarily unsealed. At any rate, it so appeared to those who watched the trucks almost literally fly past, and it was not long before the original three divisions which started from the Battery were split up into nearly ten times that many.



AT UNION SQUARE, WHERE THE PARADE MAINTAINED ITS FORMATION

But as fast as some of the trucks were driven, they still afforded a prime chance for their owners to advertise either the trucks or the merchandise which they carried, or the owners themselves. Every entrant was permitted to load his truck with whatsoever he willed, and nearly every one of them took advantage of the privilege. Brewery trucks, heavily laden with what

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ON FIFTH AVENUE WHERE THE PARADE WAS LOST IN THE MAZE OF GENERAL TRAFFIC



NEW YORK TRUCK PARADERS LINING UP FOR THE START FROM BATTERY PARK

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appeared to be beer—the kegs were there, anyway—sped past; furniture vans piled high with furniture, and all manner of other vehicles loaded to the "gunwales" were included in the moving display.

The honor of having the greatest number of trucks of the same make en route went to the Autocar Co., of Ardmore, Pa., as represented by the Autocar Sales Co., of New York, which had upward of forty trucks, all bearing the Autocar name-plate, in the procession. The United States Motor Co. was next with some twenty-three Sampson trucks, and the General Motors Co. was third with twenty G. M. C. trucks. These were the largest delegations of single makes, though there were others, notably the International Motor Co., which had ten Mack trucks and six Saurers of varying capacities, which were well represented. For instance, there were seven Couple-Gear trucks up at the head of the procession—by reason of their size they looked to be more than seven; there were about a dozen Alcos and a similar number of both Packards and Pierce-Arrows. Walter trucks were well represented, and so were White, Pope-Hartford, Knox, Garford, Knickerbocker, Gaggenau, Federal, Chase and any number of others. But the procession was not made up entirely of gasolene trucks, though they formed a considerable portion of it. Electrics were very much in evidence. The General Vehicle electrics in particular were conspicuous, there being no less than thirty-eight of them in line. Among the other makes of electrics that turned out, Hupp-Yeats, Baker, Detroit and Bronx were represented.

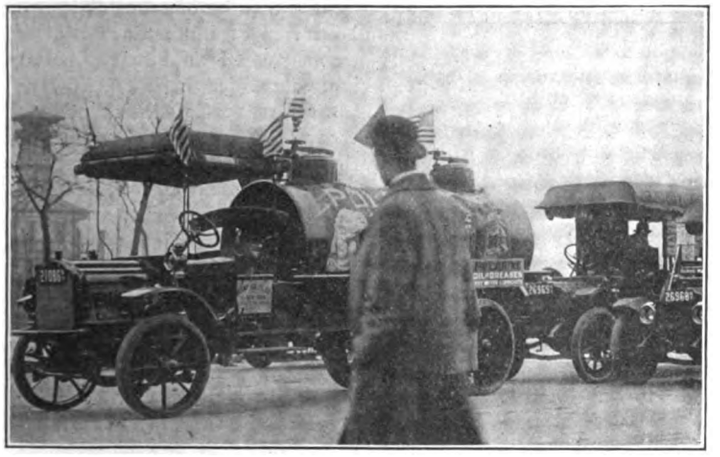


WHERE THE BAND PLAYED

Though there was little that was spectacular about the "parade," decorations of any kind being conspicuous by their absence, there still was plenty to hold the attention of the onlookers. Up at the head of the procession the Autocar army truck, which recently completed a strenous 1,500-mile trip from Washington to Indianapolis, and which still carried liberal quantities of mud, caused comment. The Knox Martin tractor was another vehicle which drew attention; but the ones that excited the most curiosity were the General Vehicle battery crane trucks. These little vehicles, scarcely a quarter the size of most of the other trucks in the procession, are intended for the rapid handling of heavy merchandise, and speeding silently along with the van, their cranes being their most conspicuous feature, never failed to attract and to hold attention as long as they were in sight.

In all, there were upward of fifty different makes of vehicles in line, and though the trade was well represented, for the most part the trucks were the property of private owners or corporations, bent on displaying to the general public their up-to-date equipment and the facility with which merchandise destined for long or short hauls can be handled. And whatever else the procession may have shown, it at least demonstrated the ease of handling motor trucks in congested traffic, the loads which can be hauled as compared with those which can be transported by means of horsed vehicles, and the greater speed in distribution which is possible with modern motor-propelled apparatus.

E. W. Curtis, Jr., was chief marshall, and headed the procession riding in an electric coupe. C. W. Fletcher and T. A. Aspell acted as chiefs of division, and the other aides were as follows: G. M. Curran (International), D. D. Robinson (Baker), R. R. Clayton (Studebaker), H. C. Brown (Sampson), F. B. Kutz (Pierce-Arrow), E. A. Bedell (B. F. Goodrich Co.), N. Mallouf (Peerless), P. J. Dougherty (Anderson), F. W. Dix (Pope-Hartford), C. W. Wurster (Commer), J. M. Young (Chase), M. J. Adams (Alco), J. L. Breese, Jr. (Commer), G. E. Anderson (B. F. Goodrich Co.), E. O. Hoopergarner (Swinehart), A. L. Barringer (Sampson), G. L. Moore (Swinehart).





STRIKING EVIDENCE THAT ADVERTISING OPPORTUNITIES WERE NOT NEGLECTED BY SOME OF THE PARADERS



KNOX TRACTOR IN LINE

Automobiles Factors in "Race Suicide."

How an automobile could be guilty of, or an accessory to, race suicide is rather difficult to understand, but Professor Robert J. Sprague, of Amherst College says so, and he claims he has the proofs. According to the professor automobiles and oriental rugs are the chief things that keep wealthy—or medium well-to-do—people from having children. They love—still according to Profesor Sprague—the speeding motor car more than children, and the human race is the loser.

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FEDERAL AID GETS SLIGHT BOOST

Congress Committee for First Time Favorably Reports a Bill—But It's a Makeshift and Helps Little.

While the bill introduced by Congressman Shacklefield, of Missouri, and favorably reported late last week by the House Committee on Agriculture, is at best but a makeshift, it is important as being the first of the many Federal "aid" bills to make such progress. The Shacklefield bill, while not enthusiastically supported, is at least not opposed by the automobile interests of the country—not because it is a particularly good bill, or because it represents a solution of the question of Federal aid, but because it is the best that has been offered so far. If it were passed it would serve chiefly to promote widespread and thinly-spread road tinkering, instead of real improvement; but its passage, despite the House Committee's approval, is wholly unlikely.

The measure makes provision for a prorata payment for the use of State or County roads by Federal employees (letter carriers on rural free delivery routes), and for this purpose divides the roads into three classes—A, B and C. As the bill provides for compensation only in the case of roads of certain quality, which fulfill the requirements of the government, it is claimed by the supporters of the bill that it will result in immediate activity on the part of communities in which the roads are poor, in order that they may collect compensation claims. An "estimate" of the road rental which the State of New York or its counties could collect for the first year from the government under the provisions of the Shacklefield bill, fixes the amount at about $650,000.

The full text of the bill is as follows:

That for the purposes of this Act certain highways of the several States, the civil subdivisions thereof, and companies incorporated under the laws of the several States are classified as follows:

Class A shall embrace well-graded roads outside of incorporated cities, towns, and villages of not less than one mile in length, upon which the steepest incline shall not exceed five per centum wherever practicable, not less than twenty-five feet wide between the ditches, well drained, with a wagon way or road track not less than twelve feet wide, composed of bituminous macadam, brick, or of macadam, not less than six inches thick, rolled, bonded, and maintained with a smooth, firm surface, both shoulders and roadway properly constructed and continuously cared for.

Class B shall embrace well-graded roads outside of incorporated cities, towns, and villages of not less than one mile in length, upon which the steepest incline shall not exceed five per centum wherever practicable, twenty-five feet wide between the side ditches, well drained, with a wagon way or road track twelve feet wide, composed of burnt clay, shells, sand, clay, or gravel, not less than eight inches thick, continuously kept well compacted, and with a firm, smooth surface, with roadway well and properly crowned, so as to quickly shed water into the side ditches.

Class C shall embrace roads outside of incorporated cities, towns and villages of not less than one mile in length, upon which the steepest incline shall not exceed five per centum wherever practicable, which shall be kept well graded, crowned, and drained to a width of not less than eighteen feet, with split-log drag or other similar means, so as to be reasonably passable for wheeled vehicles at all times.

Sec. 2. That whenever the United States shall continuously use any highway of any State, or civil subdivision thereof, or of any company incorporated under the laws of any State, which fall within classes A, B or C, for the purpose of transporting free rural-delivery mail, compensation for such use shall be made at the rate of thirty dollars per annum per mile for highways of class A, twenty dollars per annum per mile for highways of class B, and ten dollars per annum per mile for highways of class C. The United States shall not pay any other compensation or toll for such use of such highways than that provided for in this section, and shall pay no compensation whatever for the use of any highway not falling within classes A, B or C.

Sec. 3. That the Director of Roads in the Department of Agriculture shall determine the class, if any, into which any road shall fall, and his determination upon that subject shall be final.

Sec. 4. That the compensation herein provided for shall be paid at the end of each fiscal year by the Treasurer of the United States upon warrants drawn upon him by the Postmaster General to the officers or persons entitled to the custody of the funds of the respective highways entitled to compensation under this Act.

Sec. 5. That this Act shall go into effect on the first day of July, nineteen hundred and thirteen.

Jersey Chauffeurs Become "Associated."

With the announced intention of "raising the standard of the men employed in operating motor cars in New Jersey and conserving the interests of the employer," an organization of professional chauffeurs has been launched in Newark, N. J., under the style Associated Motor Operators. Temporary quarters have been engaged at 313 Halsey street, where the first organized meeting was held on Monday last, 15th inst. Thirty-three charter members attended the meeting and elected the following officers to serve for the next six months: A. H. Langdon, president; A. C. Haughawant, vice-president; W. K. Donaldson, secretary; E. G. Filtz, treasurer; J. Heaver, sergeant-at-arms; William Brooks, C. E. Bentley and H. L. Greenough, examining committee.

Hail "Agrimotors" and "Autoporters."

In the straining for originality they achieve some fearful results on the "other side." One of the automobile publications, for instance, is endeavoring to popularize "agrimotors" as a descriptive of steam plows, gasolene tractors and other vehicles designed for the emancipation of the farm horse, and is applying the term "autoporters" to vehicles used for light delivery work, such as tricycles.

"ELEPHANT" ON UNCLE SAM'S HANDS

It's a Britisher's Automobile Seized More Than Five Years Ago—Commission to Settle Date of Purchase.

"The United States vs. One 30-Horsepower Automobile" is the title of an action which is on the current calendar of the admiralty division of the United States District Court for the Southern District of New York. Behind the somewhat mystifying title there lies an apt illustration of the law's delays and a tale of six years of adventure experienced by a 30-horsepower C. G. V. car of the vintage of 1905, which for eleven short months was the property of one James Pearce, of London, England, but which for the past five and one-half years has been reposing peacefully in one of the many storehouses in which Uncle Sam keeps the thousands of articles he confiscates annually from "forgetful" travelers.

The case seems to involve at least one consul-general and to be of more or less international interest or importance, and apparently grows out of an alleged mistake in the shipping invoice made out by the London Motor Garage Co., which originally sold the car to Pearce, on September 6, 1905, for the sum of £860. When Pearce came to visit America, on October 24, 1906, he declared in good faith, and upon the particular advice of Consul-General Wynne, that he was a non-resident and that the automobile had been used by him and his family for one year. A cursory examination of the shipping records and bill of sale for the car, however, showed that it had been shipped to Pearce, who at the time was in Paris, on November 1, 1905, and not in September, as he claimed. This date would make the time of the car's "servitude" less than eleven months, instead of the full year sworn to by Pearce. Thereupon the customs officers at New York promptly confiscated the car.

Pearce made several attempts to have the matter adjusted, but lost out each time, until last May, when he petitioned the court to appoint a commission of four prominent Englishmen, who were to be authorized to take testimony on the other side regarding the exact dates of sale and shipment of the car. The United States court granted the motion and the commission was appointed last summer. What its members discovered probably will be told in the hearing which has been set for this week before Judge Hough in the Federal court.

Mayor Favors City License for Trucks.

According to a bill which has been introduced in the Ohio legislature, at the suggestion of Mayor Helmbold of Cincinnati, motor wagons used for commercial purposes are to be licensed by cities, regardless of what disposition the State automobile law makes of them.

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CENSUS DISCLOSES MORE DETAILS

Latest Preliminary Report Particularizes Nature of Automobile Output—How It Compares With Horse Vehicles.

Having presented statistics of the automobile industry in two previous reports, the United States Census Bureau has issued what is styled the "second preliminary report," which permits the industry to be viewed from still another angle. While the totals are the same, it differs from the previous documents in that it separates the various types of vehicles, enumerates the number produced and the value of each, which enumeration will serve forever to settle considerable speculation which has existed.

The report, of course, covers the five-year period 1904 to 1909, during which the production leaped from 22,830 cars to 127,287 Previous to 1904, automobiles were included in the general statistics of carriage and wagon manufacture, the number of purely automobile factories being too insignificant to constitute an industry. In 1899, according to the Federal figures, there were produced only 3,897 vehicles, so that the total for 1909 represents a gain of approximately 3,300 per cent. in the period of ten years. The value of all products of the automobile industry proper, as already made known by the previous preliminary report, was $249,202,075 in 1909, as against $30,033,536 in 1904; but the Census Bureau points out that under the designation "All Other Products" are included the products of establishments engaged in the manufacture of automobile bodies and parts which were sold largely to automobile manufacturers, as well as the bodies and parts made and sold separately by automobile manufacturers.

Gasolene machines formed 95.1 per cent. of the total number made in 1909, and 86.2 per cent. 1904. Of the total number manufactured in 1909, 3,226, or 2.5 per cent., were rated at 50 h.p. or more; 51,218, or 40.5 per cent., at from 30 to 49 h.p.; 35,257, or 27.8 per cent., at from 20 to 29 h.p.; 29,353, or 23.2 per cent., at from 10 to 19 h.p., and 7,539, or 6 per cent., at less than 10 h.p. Passenger vehicles constituted 97.4 per cent. of the total number, and business vehicles 2.6 per cent.

The "second preliminary report" of the carriage and wagon industry, which serves to show the inroads that have been made on the horse vehicle during the census period of five years, naturally is of value to the automobile trade and will assist reckonings of future probabilities. While the valuation of horse vehicles did not decline in corresponding proportion, the number in each instance fell away approximately 100,000 vehicles in the case of both carriages and wagons. The figures for both industries are shown in detail by the accompanying table.

STATISTICS OF THE AUTOMOBILE INDUSTRY, 1904-1909

Product	1909 Number	1909 Value	1904 Number	1904 Value
Total Value	.....	*$249,202,075	.....	†$30,033,536
Automobiles	126,593	164,269,324	21,692	23,751,234
Gasolene	120,393	153,529,653	18,699	19,566,941
Electric	3,826	7,259,430	1,425	2,496,255
Steam	2,374	3,480,241	1,568	1,688,038
Passenger Vehicles (pleasure, family and public conveyances)	123,338	159,039,301	21,281	22,804,287
Gasolene	117,633	149,530,232	18,504	19,300,654
Electric	3,331	6,028,828	1,211	1,819,595
Steam	2,374	3,480,241	1,566	1,684,038
Buggies	4,582	2,391,250	(‡)	.....
Gasolene	4,314	2,039,129	(‡)	.....
Electric	268	352,121	(‡)	.....
Runabouts	36,204	28,030,479	12,131	8,831,504
Gasolene	35,347	27,116,901	10,999	7,976,821
Electric	496	648,630	455	453,304
Steam	361	264,948	677	401,379
Touring Cars	76,114	113,403,188	7,220	11,781,521
Gasolene	73,883	109,844,295	6,444	10,576,023
Electric	243	387,526	39	55,038
Steam	1,988	3,171,367	737	1,150,460
Closed (Limousine, Cabs, etc.)	5,205	12,729,304	(‡)	.....
Gasolene	3,290	8,762,768	(‡)	.....
Electric	1,915	3,966,536	(‡)	.....
All Other (Omnibuses, Sight-seeing Wagons, Ambulances, etc.)	1,233	2,485,080	1,930	2,191,262
Gasolene	799	1,767,139	1,061	747,810
Electric	409	674,015	717	1,311,253
Steam	25	43,926	152	132,199
Business Vehicles (Merchandise)	3,255	5,230,023	411	946,947
Gasolene	2,760	3,999,421	195	266,287
Electric	495	1,230,602	214	676,660
Steam	.....	.....	2	4,000
Delivery Wagons	1,862	1,918,856	251	455,457
Gasolene	1,645	1,474,063	140	215,897
Electric	217	444,793	109	235,560
Steam	.....	.....	2	4,000
Trucks	1,366	3,165,512	160	491,490
Gasolene	1,090	2,384,703	55	50,390
Electric	276	780,809	105	441,100
All Other	27	145,655	(¶)	.....
Gasolene	25	140,655	(¶)	.....
Electric	2	5,000	(¶)	.....
All other products, including bodies and parts	.....	§78,584,753	.....	5,431,249
Amount received for custom work and repairing	.....	6,347,998	.....	851,053

* In addition, 694 automobiles, valued at $830,080, and bodies and parts valued at $4,415,266, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

† In addition, 1,138 automobiles, valued at $879,205, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

‡ Not reported separately.

¶ None reported.

§ Includes custom work and repairing by establishments manufacturing bodies and parts.

STATISTICS OF THE HORSE-DRAWN INDUSTRY, 1899-1909

Product	1909	1904	1899*
Total Value	*$159,892,547	†$155,868,849	$138,261,763
Carriages (family and pleasure):			
Number	828,411	937,409	904,639
Value	$47,756,118	$55,750,276	$51,295,393
Wagons:			
Number	587,685	643,755	570,428
Value	$39,932,910	$37,195,230	$31,080,738
Business—			
Number	154,631	133,422	(‡)
Value	$16,440,816	(‡)	(‡)
Farm—			
Number	429,952	505,025	(‡)
Value	$22,615,875	(‡)	(‡)
Government, Municipal, etc.—			
Number	3,102	5,308	(‡)
Value	$876,219	(‡)	(‡)
Public Conveyances (cabs, hacks, hansoms, hotel coaches, omnibuses, etc.):			
Number	2,243	2,711	2,218
Value	$939,267	$1,314,952	$1,114,090
Sleighs and Sleds:			
Number	100,899	127,455	117,006
Value	$2,065,850	$2,694,560	$2,290,903
Automobiles:¶			
Number	544	199	174
Value	$569,119	$235,675	$129,053
All other products, including parts and amount received for repair work	$68,629,283	$58,678,156	$52,351,586

* In addition, 14,908 carriages, valued at $1,078,935; 42,112 wagons, valued at $2,093,288; 104 public conveyances, valued at $5,615; 8,209 sleighs and sleds, valued at $165,917; and parts and materials, valued at $1,184,256, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

† In addition, carriages and wagons, valued at $612,173, were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designation.

‡ Not reported separately.

¶ Automobiles manufactured in establishments devoted primarily to the manufacture of carriages and wagons.

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DISBROW LOWERS THREE RECORDS

On San Jose Track He Displaces Oldfield's Figures—Completes Twenty-five Miles in 22:26⅗.

Louis Disbrow, who, under the active management of J. Alexander Sloane, has been emulating the one-time efforts of his redoubtable predecessor, Barney Oldfield, and has been treating the natives of the Pacific Coast to some fast track driving, again appeared at a local meet on the San Jose (Cal.) Driving Park course on Sunday last, 14th inst. Discarding his latest and fastest speed creation, the 190 horsepower reconstructed Fiat, which has been styled the "Jay-Eye-See," he held the wheel of Ralph De Palma's 90-horsepower Simplex and drove to such good purpose that he is credited with having shattered the 15, 20 and 25-mile records which have been held by Oldfield since September, 1910.

Inasmuch as the meet was held under sanction of the American Automobile Association, and as Disbrow was clocked under the supervision of P. J. Walker, who is the Pacific Coast representative of the A. A. A., the records must be accepted at their face value, at least until such time as the Contest Board can pass on them and determine whether the conditions governing the establishment of records have been complied with. Despite the fact that the track was not in the best of condition owing to continued rains, Disbrow made 15 circuits in 13:30, 20 in 17:57⅘, and 25 in 22:26⅗. According to the records, the best previous time for these distances was made by Oldfield in Milwaukee on September 27th, 1910. Oldfield's times were, 13:41.40, 18:15 and 22:47, for the three distances, respectively.

Where Joy Riders Lose Their Licenses.

By issuing an executive order the government of the kingdom of Wuerttemberg, Germany, two months ago endeavored to curb the growing tendency of chauffeurs to use their employers' cars for "joy-rides." As was pointed out in the Motor World some months ago, the German law fails to make provision for punishment of people using another person's car without permission, excepting that gasolene and oil belonging to the owner of the car have been used on the ride. It was found that the passage of such a law would entail so much lost time, that the officials of Wuerttemberg decided to employ the short cut of an executive order coming direct from the ministry of the interior. According to this order any chauffeur who is detected in using his employer's, or any other man's, car without special permission, loses his license and cannot have it restored at any future time. This severe punishment, in the few weeks that it has been in effect, has been so successful that the Bavarian government last month took similar action. The other German States are expected shortly to issue and promulgate similar orders.

St. Louis Speed Law Held Valid.

In an opinion delivered in a damage suit instituted by Catherine Steinlage against Charles Wiegand for the wrecking of the former's automobile, Judge McQuillin, of the Missouri State Court in St. Louis, decided that the city ordinance limiting the speed of automobiles to 10 miles per hour is valid, despite the fact that the State law fixes 25 miles as the permissible limit. In his ruling the judge declares that the State law does not mean that a lower rate of speed than 25 miles an hour would be conclusive evidence that the motorist was driving in a "careful and prudent" manner, as the automobile law requires, and that he was not guilty of preventive negligence. The attorney for the defendant had contended that owing to the conflicting wording of the city ordinance and the State law, the former should be held invalid, and that the damage suit should be dismissed, as being based on the violation of an invalid ordinance.

Wants $10,000 for Pain and Lost Titles.

Claiming that an accident to her automobile on the streets of Cleveland, O., robbed her of her titles as tennis, skating and whist champion of Canada, Mrs. Annie C. Burgess, of Toronto, Can., has filed suit in the Ohio Supreme Court, in Cleveland, against Rinehart Bros., paving contractors of New Lisbon, O. According to her complaint, Mrs. Burgess was attending the State tennis tournament at Cleveland when the accident occurred, and her automobile ran into an excavation of the street, which, it is alleged, was not protected by red lights. She received injuries in the accident which, she claims, prevented her from taking part in the annual championship tournaments of Canada and defending her various titles. She values this loss, coupled with the bodily pain in having her wrist and ankle wrenched, at $10,000.

Corning Motorists Organize a Club.

The Corning Automobile Club has been organized in the New York town of that name, with the following officers: H. H. Kendall, president; M. E. Gregory, vice-president; F. P. White, secretary, and Winfield C. Sleight, treasurer. The board of governors comprises John L. Lewis, John M. Pitt, W. J. Tulley, H. L. Holluster, Charles Githler and Dr. C. F. Buckland.

Case Heads New Club in Peoria.

E. J. Case has been elected president of the newly organized Peoria (Ill.) Automobile Club. The others officers are: W. C. Collins, vice-president; C. E. Ulrich, secretary-treasurer. The directors are: W. E. Hull, W. C. Roberts, Thomas H. Webb, R. H. Johnson, Carl Block, Dr. F. B. Waugh, H. B. Pinkerton, H. G. Herget, S. K. Hatfield and D. Nelson.

INDIANA SPEED LAW NULLIFIED

Court Holds That "Closely Built-up Portions" Clause is Too Vague—Victory for Two Chauffeurs.

Although the report repeatedly has spread that the automobile laws of Indiana—and, by inference, those of other States—are unconstitutional because of the vague wording of the clause regarding the "closely built-up portions" in which the speed limit is restricted, judicial confirmation of the alleged unconstitutionality had been lacking. Last week, however, the Circuit Court of Appeals of Indiana, in reversing the decision of the lower court in the cases of two chauffeurs, Walter Johnson and W. Ottman, ruled that no prosecutions for violating the speed limit can be made, as the law is unconstitutional. The court held that the definition, "in the business and closely built-up portions of any municipality" is too vague to allow of embodiment in a valid law or ordinance. The paragraph declared invalid is as follows:

"Any person or persons operating a motor vehicle on any public highway or in any public place shall not operate the same at any rate of speed greater than is reasonable and proper, having regard for the use in common of such highway or place, or so as to endanger the life or limb of any person, and in no event shall such motor vehicle be operated at a greater rate of speed than eight miles an hour in the business and closely built-up portions of any locality."

To Repeat the Four States Tour.

July 9th has been fixed as the tentative date for the start of the second annual Four States tour, under the auspices of the Indiana Automobile Manufacturers' Association, which was inaugurated last year, chiefly to boom Indiana products in that State and in three States adjacent thereto. On the forthcoming occasion, the route will be laid through Indiana, Ohio, West Virginia and Kentucky, and the contest will last about 15 days. The rules will be as easy as those of last year, the competitive feature of the event being of a merely nominal nature. Long stops will be made in all of the promising towns en route and the citizens thereof be given a good look at the cars and an ample supply of advertising literature.

Car With a Record of 135,000 Miles.

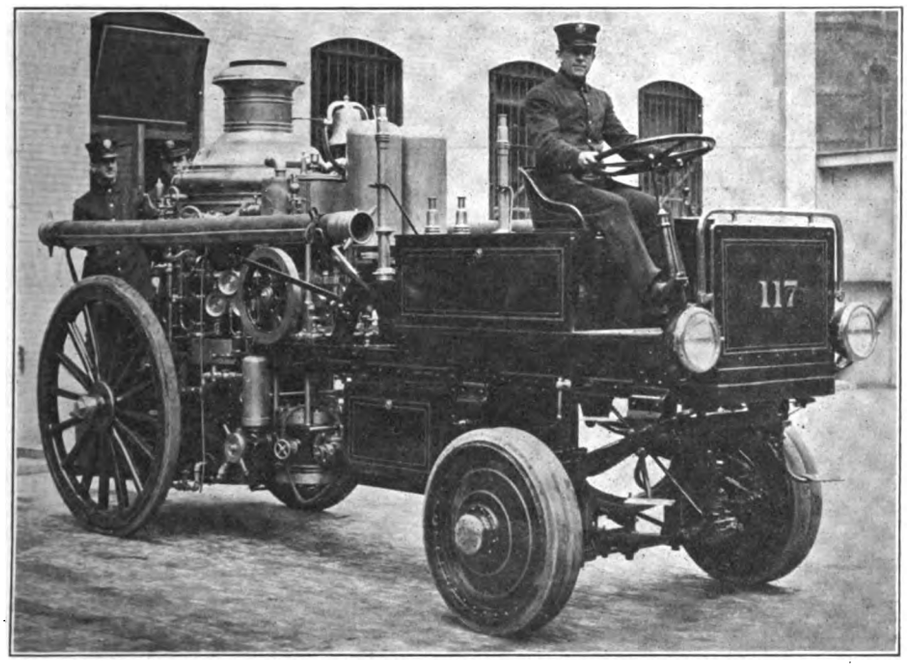
To the oft-asked question, "How many miles will a car last?" Harry Vissering, president of a Chicago railway supply company, is the latest to make answer. He avers that his 40-horsepower Alco car, purchased in 1907, has been driven 135,000 miles, and though twice upset in ditches, still is in service, having suffered no serious damage. Incidentally, the last pair of rear tires lasted for 10,000 miles.

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NEW YORK'S ELECTRIC FIRE FIGHTER

First "Steamer" Adapted to Electric Propulsion Goes Into Service—How the Conversion Was Brought About.

As is perfectly right and proper, the Fire Department of the City of New York has a rooted objection to throwing away perfectly good steam fire engines that cost $6,000 apiece, even to make room for motor propelled apparatus. But the department is being gradually and surely modernized, and the engines cannot be allowed to lag behind in the general progress. Therefore, with a view to making a compromise between needless expense on the one hand and lack of progressiveness on the other, the department has for some time been making experiments with converted steamers, utilizing the entire steam pumping plant and adding a propelling mechanism.



COUPLE-GEAR BATTERY DRIVEN CONVERTED FIRE ENGINE

The first tentative experiment consisted of attaching a steamer to a Couple-Gear tractor and hauling it around the streets to get an idea as to how the engine would lend itself to this means of propulsion; but nothing further was done in this direction. Soon afterward, an engine was converted by the Nott fire engine company by building in a gasolene motor of 110 horsepower, driving the rear wheels through a complicated system of shafts, bevel gears and sprockets. Though capable of great speed, this machine has been out of service and in the repair shop much of the time, owing to the enormous weight of the engine and transmission system. A few weeks ago the Christie front-drive system was applied to an engine, and the resulting machine was illustrated and described in the Motor World at the time of going into regular service. This engine and its novel propelling mechanism have given splendid satisfaction, never having missed an alarm and always being ready to respond to the very frequent calls in the busy district where it is stationed.

The third converted engine differs from both the others in that it is electrically driven, but resembles the Christie in that it drives through the front wheels. The conversion was made by the Couple-Gear Co., of New York, by installing a pair of Couple-Gear wheels with enclosed motors and a battery to furnish the current. As the illustration shows, the result is a decidedly sightly machine, and one of its characteristics is that it moves practically without a sound; in fact, it is so quiet when in motion that it is difficult to realize that it is not coasting. It is believed that this is the first time a fire engine has been "motorized" by the use of electric propelling apparatus.

The control of an electric vehicle is simple in the extreme, but special pains have been taken to reduce the control system of the big fire engine to the very last point. A controller of the street railway type gives five speeds forward and five in reverse, and is mounted at the left side of the single bucket seat; but it is used only when starting and after stopping, speed control on the road being effected through a pedal. In starting, the controller is thrown forward a notch at a time until it is on the high speed point. After that the driver presses forward the control pedal to maintain the speed, and if allows the pedal to return under pressure of its spring the speed will be reduced by degrees, until at the point where the pedal stops the current is cut off from the motors. This pedal is controlled by the left foot, while the right foot takes care of the brake, so that the driver has both hands free to steer with. The foot control of the current is effected through a resistance. When all the resistance is out and the motors are getting full current, the machine will run twenty miles an hour, and any intermediate speed can be obtained by the use of the resistance.

The battery consists of 80 cells of National thin-plate type, 11 plates to each cell, and gives the machine a radius of about twenty miles on one charge, which is, of course, considerably more than it is likely to require at any time in regular service. weight is almost equally distributed on all four wheels, the rear wheels carrying about 400 pounds more than the front wheels. Gibney 3½-inch dual tires are fitted to the 36-inch front wheels, the rear wheels already having solid rubber tires.

After having undergone a number of preliminary road tests, the engine, No. 117, was yesterday sent to its post at the Jay street station, in Brooklyn, where its ability to do real work in the service of the department will be thoroughly tried out.

King's Skeleton Paraded in Western City.

An animated skeleton has been running around the streets of Milwaukee, Wis., of late, and though the sight was an unusual one, it created no alarm even in the most timid, for it was the skeleton of a motor car—a King. The local agents, Eustis Bros., hit upon this method of showing just how every part of the mechanism worked. Everything was removed except those parts necessary to the operation of the machine—even the driver's seat went, to be rplaced by a mere box, and the gasolene tank gave place to an ordinary one-gallon can. All the parts were marked with their names in plain letters, so that he who saw the car run might read. While body-less chassis often have been seen in the streets, this probably is the first time the idea has been carried to the limit and made use of for advertising purposes, and doubtless it will not be the last, for the scheme apparently worked well and attracted no end of attention.

End of Muffler Cut-Outs in New York.

For some reason, Mayor Gaynor, of New York, did not see fit to attach his signature to the ordinance passed April 3rd by the Board of Aldermen, prohibiting the use of muffler cut-outs. As he failed to disapprove it, however, the ordinance automatically became a law on Saturday last, 13th inst. In accordance with its terms, however, it will not become effective until 90 days hence.

Guarantees Cars Against Fire and Theft.

In Spokane, Wash, at least, one of the most prominent dealers is now selling his cars with a one-year guarantee against fire and theft. He is Harry L. Olive, who handles Overland and Thistle cars.

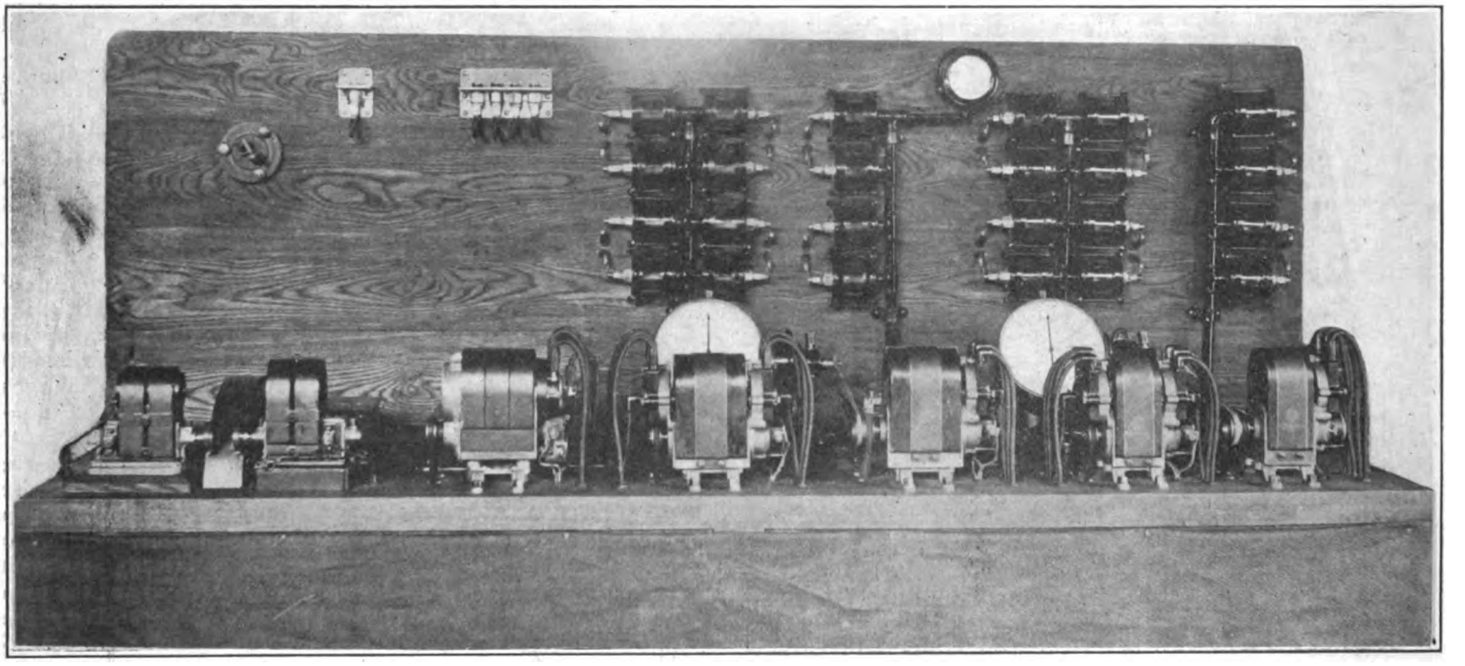
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MAKING PLAIN MAGNETO'S WORKING

One of the Several Demonstrations Employed by the Remy Company—Proof of Sparking at Low Speeds.

Dark as the subject of ignition may be to the average man of non-technical proclivities, it is doubtful if he could view the demonstration employed by the Remy Electric Co., of Anderson, Ind., and go away without knowing at least what a magneto spark looks like, and, what is more to the point, exactly what it looks like when it occurs in the cylinder of an engine at the instant the explosion takes place. For that is exactly what the demonstration is arranged to show and it shows it in a manner that is more than ordinarily clear.

The principal purpose of the whole demonstration, of course, is to display some of the better known Remy products in actual operation, and no less than five magnetos, all different—four of them being new types—are shown generating long sparks and short sparks and fat sparks, but they are all hot sparks. From left to right the five magnetos in the picture as as follows: Type 1912 S, for automobiles; type RG, double distributor tractor magneto; type RF, for heavy duty motors and tractors; type RE, double distributor automobile magneto; and type RD, which is the well known four-cylinder automobile motor instrument. One of the real features of the exhibit is what has been styled the "hot spark at low speed test," and it has been arranged for the particular education and edification of those who may perhaps doubt the ability of a magneto to deliver a really hot spark at very low speeds. The plugs are fixed in air-tight glass chambers, into which air under 100 pounds pressure is injected by means of a force pump. When the armature of the magneto is rotated at speeds of even less than 100 revolutions a minute sparks passing between the electrodes of the plugs are plainly visible.



DEMONSTRATING THE OPERATION OF REMY MAGNETOS WITH THE AID OF "BOTTLED" PLUGS

Funnel That Facilitates Filling Operations.

It is not always easy to fill a gasolene tank holding a funnel with one hand and the gasolene can with the other. The difficulty may be overcome by soldering three "legs" to the rim of the funnel so that it will stand alone with the small end projecting into the tank. If the "legs" are of the proper length, this method of treating the funnel has the additional advantage that an air space is left between the small end of the funnel and the filler hole in the tank, the result being that the tank may be filled more rapidly and with less danger of the fuel slopping out. Obviously the method is most applicable where the gasolene tank is located under the front seats and the top is level, though with a little ingenuity the "legs" can be so constructed and arranged that the funnel will be held in position over almost any tank filler hole, no matter what the location of the tank may be.

When Pumps May Act as Obstructions.

Where a pump is utilized to circulate the cooling water, it is wise to fill the radiator to the top and then turn the engine over several times, so as to insure the water reaching and filling all parts of the system. If the motor is not turned, the pump is an obstruction to the passage of the water into the jackets, which remain partly empty, or fill so slowly as to leave the impression that there is more water in the system than there actually is.

CLAIMS FIRST FOUR-CYLINDER CAR

New Jerseyman Arises and Avows That He Built It in 1898—And Despite Crudity It's Still Going.

The question as to who built the first four-cylinder motor car in the United States always has been a mooted point, and it has been discussed, with unsatisfactory results, on several occasions of late. Within the last week, however, a claimant for that honor has arisen in the person of Fred F. Smith, of Bridgeton, N. J., who became interested in self-propelled vehicles early in their history and built one, which still is in running order and giving a good account of itself.

It was in 1898 that Smith commenced the construction of a two-cylinder car, but when the machine was practically completed he went to Paris, where he attended the Exposition, saw the cars exhibited there, and decided to change his own machine from two cylinders to four. He purchased a four-cylinder motor with a bore and stroke of 3¼ and 3½ inches, respectively, which was installed, driving through a propeller shaft and bevel gears to a jackshaft and thence by side chains to the rear wheels, which were mounted on a solid steel axle.

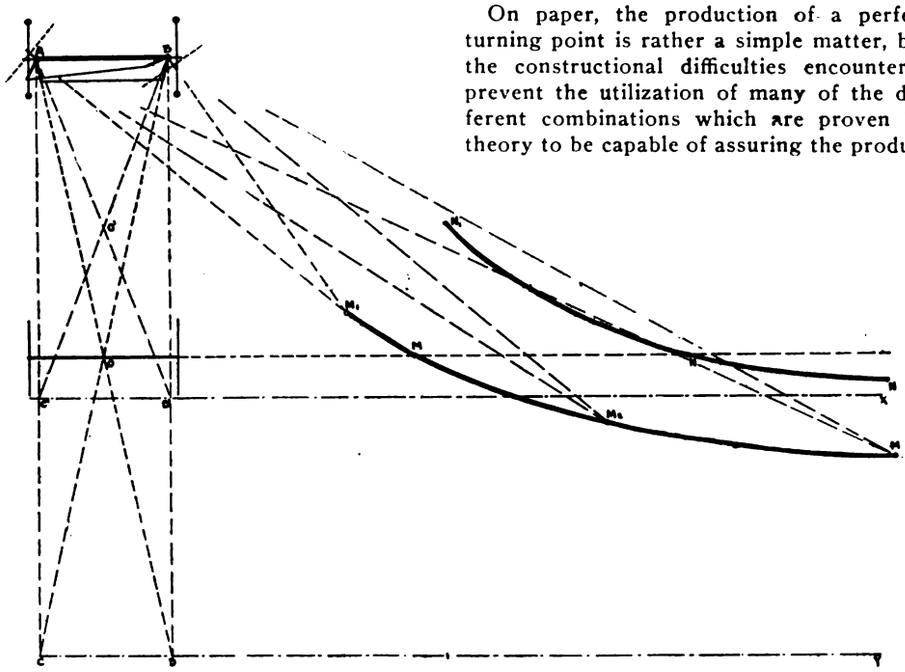
The steering wheel was on the left side and the control located in the center. The body was purchased from the Columbus Buggy Co., of Columbus, O. Smith's car is not touted as a racing machine by any means, but is said to be entirely capable of traveling under its own power, notwithstanding the fact that it is some fourteen years old.

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DETERMINING THE ANGLE OF STEERING KNUCKLES

Little Known Problem of the Steering Gear and the Effect Its Solution May Have on Tire Wear and Skidding—Comparison of American and French Methods of Designing That Reveals the Results Obtained With Both Systems—How They Differ.

Of the very many problems, some simple and others more or less involved, which occupy the time and try the patience of the automobile designer and constructor, probably none is more important than the production of an efficient and reliable steering system—a system strong and rigid throughout, and yet capable of quick movement by the operator, and which will at all times answer to the slightest pressure on the guiding wheel, impart direction to the car, and yet so constructed that the



GRAPHIC PORTRAYAL OF STEERING KNUCKLE ANGLE ERRORS

great pressures which are occasioned by the road wheels encountering obstacles, which tend to cause them to veer from their course, will produce little or no effect on the guiding wheel.

Likewise, such a steering system as this must be so designed that the chance of slideslip and skidding is reduced to a minimum when the car is being turned, and it is in the achievement of this last requirement that many interesting problems arise—problems which have been studied since "horseless carriages" first were evolved from the horse-drawn kind, and which probably will be studied until study ceases to bear fruit. Not that the system in vogue and which, in theory at least, is standard with practically all manufacturers is lacking to the degree where change is essential, but still it is not yet perfect, and until it is perfect improvement naturally will be sought.

A perfect turning point for any vehicle is a point so located that each of the wheels of the vehicle travels in a curvelinear path around this point as a center, and it is this factor that occupies more of the designer's mind that the outside world ever dreams. The conditions for the production of a perfect turning point, then, require that the prolongations of the axis of rotation of all of the four wheels intersect at a common point.

On paper, the production of a perfect turning point is rather a simple matter, but the constructional difficulties encountered prevent the utilization of many of the different combinations which are proven by theory to be capable of assuring the production of a perfect turning point, no matter what may be the steering angle.

The fulfilment of the conditions for obtaining correct steerage on a two-wheeled vehicle, such as a bicycle, or on a three-wheeled one wherein one wheel is used for steering and the other two are mounted on a common axle, embraces the use of no special apparatus, for it is obvious that no matter what may be the relative angle of the steering wheel, the prolongation of its axis of rotation always meets the prolongation of the axis of the other wheels. This is true also of a four-wheel vehicle wherein steering means are provided by pivoting the front axle in the middle, as in a wagon or a carriage, but obviously this method of steering is unsuitable for automobile use, for not only would the operation of such a device be difficult, but the frame of the car would be made unstable and the road shocks would be unduly severe on the whole steering system because of the large turning moment due to the distance of the wheel from the pivot.

The use of a split front axle, with the wheels mounted on rotatable stubs which were linked together so as to travel through corresponding arcs was first suggested and tried fifteen or more years ago by the English designer, Ackermann, but the difficulty was that if the stubs turned through the same arcs the axes were at all times parallel when the wheels were traveling in a curved path, and therefore the prolongations never could meet and the formation of a correct turning point was an impossibility. In other words, each wheel was tending to turn on a center separate from the center of the other wheel, and skidding resulted.

Ackermann's steering axle was improved by Jeantaud, a Frenchman, in a manner which made the application of the device to the modern motor car possible. Jeantaud's improvement was quite simple. Instead of making the angle formed by the intersection of the steering stub and the lever which served to turn it a right angle, as Akermann had done, he made the angle greater than the right angle, so that the connecting link, or tie rod, was shorter than the length of the solid portion of the axle, and as a consequence in turning the inside wheel always turned through a greater arc than the outside wheel. The axes of rotation, therefore, converged and met in a point. The two wheels circled this point as a common center. Jeantaud's method of determining the angle between the pivoted ends of the axle and the levers which serve to turn them is shown in the accompanying diagram. A and B are the pivots around which the movable parts of the axles bearing the wheels rotate; O is the rear axle. A point, O, in the middle of the rear axle is chosen, and from this point lines are drawn to A and B. These lines determine the angles the steering stubs make with the turning levers.

If the wheels are considered as having been turned so that the steering angle is successively 40, 33 and 25 degrees, and the directions of the axes of the steering stubs are produced in each case until they meet, it is found that when the points of intersection of these axes, M_1, M_2, M_3, are joined by a line, this line forms a curve, and the amount of bend in this curve is greatest when the steering angle is greatest, and that the curve tends to straighten out as

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the steering angle is decreased. A contributor to Omnia has shown that the curve thus formed continually approaches, although it never meets, a straight line; or, putting it mathematically, the curve approaches an asymptote. A glance at the diagram reveals the fact that the curve crosses the line O N, which is the axis of rotation of the rear wheels, in but one point, M. Correct steering is obtained only when the axes of rotation, prolonged, meet in a common point, and therefore, with this method of causing the convergance of the axes of the steering wheels, correct steering is obtained at only one steering angle.

The determination of the location of the asymptote is, according to Omnia, a very simple matter, as well as a matter of some importance, for the location of this line determines the relative error at the different steering angles. If the lines A O and B O be produced their own lengths through O, and the ends there joined so as to form the parallelogram A B C D, the line C D is the asymptote of the curve M_1 M_3, and is located at a considerable distance behind the rear axle. If the location of the asymptote were chosen with regard to its distance from the rear axle and used to determine the angles of the stub ends of the steering knuckles to the levers, many benefits would accrue therefrom, for the point of correct steering could, by properly locating the asymptote, be made at the steering angle most commonly used. Just what difference the location of this line really does make is shown in the diagram. The curve N_1 N_2 is formed when the position of the asymptote is chosen at a point directly behind the rear axle; the parallelogram is therefore foreshortened, forming A B C' D', and the diagonals of this paralellogram determine the angles of the steering knuckles. The angles are found to be greater the nearer the asymptote approaches the rear axle. A comparison of the two curves reveals that the curve M_1 M_3, as the steering angle is decreased, after having passed point M, diverges more and more with relation to the axis of rotation of the rear wheels ON, and that, therefore, the steering error must be relatively greater when the steering angle is small; with the curve N_1 N_2, however, the curve can never diverge to a very great distance relative to O N, due to the proximity of the asymptote to the rear axle. Under ordinary conditions of driving, claims the French writer, when the steering wheel is continually turned through comparatively small arcs in order to avoid bad places in the road or other obstructions, the tendency for the car to skid is very much less when the asymptote is located near the rear axle than is the case when steering knuckle angles are determined by lines drawn to the midpoint of the rear axle.

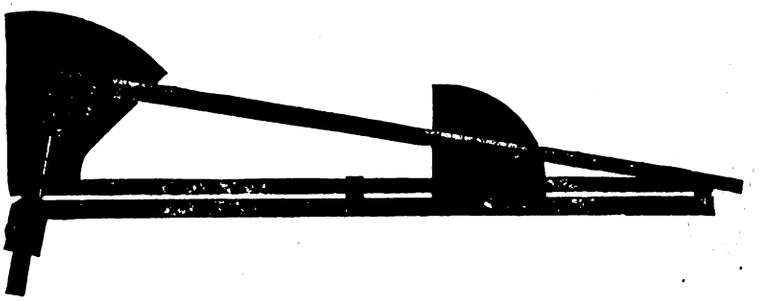
Where pivotal steering is adhered to, the determination of the angle of the steering knuckles is by an analogous method, the parallelogram, however, instead of being determined by the distance between the pivots and the distance to the asymptote, is determined by the wheel tread and the same distance. The diagonals of this parallelogram determine the angle of the steering knuckles.

Just why there is a marked tendency toward side slip and skidding when the axes of rotation of all the wheels when prolonged do not meet in a common point, easily may be illustrated. If the front truck of a railroad coach which is rounding a curve passes safely over a switch, but for some reason or other the switch is then thrown so that the rear truck passes around the siding which diverges from the main track, it is evident that before many feet are covered "something has got to go," and nine chances out of ten one of the other of the trucks leaves the rails. The same thing occurs with the automobile when the steering angle is such that a proper turning point is impossible; one or the other set of wheels slips or skids, regardless of the nature and condition of the road surface. The importance of the correct angle, therefore is manifest.

Instrument to Determine Chain Lengths.

While it would seem at first thought to be a comparatively simple matter to determine the length of a chain required for the ordinary motor car, in reality it is necessary to resort to a mathematical calculation of no little complexity in order to arrive at the correct figure. It is with a view to eliminating the trouble and the loss of time involved where such work has to be done frequently, that the Diamond Chain & Mfg. Co., of Indianapolis, Ind., has brought out an instrument styled the "Lineometer," the use of which makes it an easy matter to ascertain the length of a chain, either rolled or block type, or of a belt. The diameter of different sized sprockets or pulleys are considered, of course.

The instrument is made in two types—one of paper, suitable for occasional use, and the other of steel throughout. The illustration, which is of the steel instrument, shows the construction. Two sectors are mounted on a slotted bar, which is marked off to correspond with chain pitches. The right-hand sector is movable along the bar and is fitted with a screw clamp for holding in it any desired position, while the left-hand sector is movable vertically. The straight edge above the bar is pivoted at the right-hand end. In working out the length of a chain, the two sectors are adjusted so that the upper edge of the straight-edge cuts the arcs marked on the sectors, which represent the diameter of the sprockets that are to be used; the smaller sprocket will be represented by the arcs on the right-hand sector. The readings on the straight-edge at the points where it cuts the arcs, and on the arcs themselves, are added together, the sum being the length of the chain required in terms of the pitch, and a very simple calculation gives the length in inches. By varying the setting of the instrument, according to the directions furnished, the reading can be made to cover chains of different types and pitches and belts, crossed or straight.



DIAMOND LINEOMETER FOR DETERMINING CHAIN LENGTHS

"Ethylite" Becomes "Butylite" Lamp.

Under a new name, but only slightly changed in external appearance and mechanical construction, the Ethylite alcohol automobile lamp, which made a modest bow about a year ago and apparently held considerable promise, is again offered to the public. This time it is called the Butylite—whether in connection with "Butyl" alcohol or as a phonetic spelling of "Beauty Light" is open to argument. Benjamin N. Levy, the New York agent, when seen at his office at 32 Union Square, stated that silght errors in the construction of the original Ethylite lamps and the difficulty of arranging for proper manufacturing facilities had made their marketing slow—so slow, indeed, that a change of name was finally decided upon as offering better chances of success. The only mechanical change made is in the distance between the opening of the alcohol tube and the incandescent mantle. The lamp is claimed to burn one hour for one cent, throwing a light of 70 candlepower, without reflector, but capable of being dimmed to five candlepower if so desired.

Acid That Injures Leather and Fabric.

The acid in the electrolyte of a storage battery is extremely destructive to leather and fabrics, and also to rubber goods, such as raincoats. The immediate use of clean cold water to wash off the acid is the best thing, while the application of ammonia will neutralize the acid and minimize the discoloring action if the solution gets on the clothes. It is a very disagreeable liquid to splash around, however, and should be treated with a good deal of respect.

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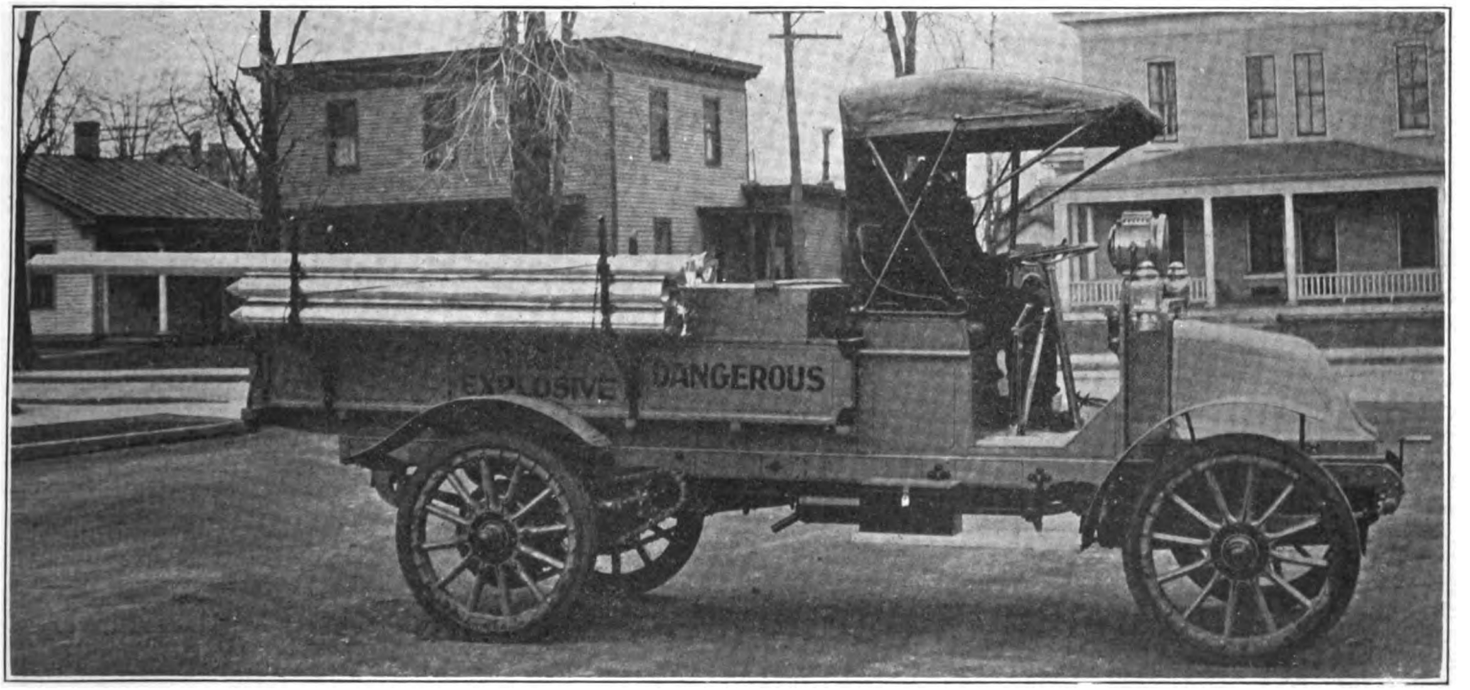
ONE TRUCK SURE OF A CLEAR ROAD

"There's a Reason" and It Is Not Easy to Guess It by Looking at the Picture—It's in the Load.

Safe to say, there are very few motor trucks that are employed for business as hazardous as that for which one is used by the Independent Torpedo Co. As the name of the company indicates, its activities are devoted to the manufacture of products that are highly explosive. Consequently, extreme care is necessary in transporting them from place to place. Nitroglycerine, for instance, is one of the substances which is used extensively, and, as everyone who is even remotely acquainted with it knows, it does not require a very great effort to explode it. Sparks or fire are not necessary; to drop a can of the material generally is sufficient to invite immediate "action," and a slight blow has been known to cause disaster.

In casting about for a solution of its transportation problem, which heretofore revolved around a couple of horse-drawn wagons, the Independent Torpedo Co. pinned its faith to the product of the Adams Bros Co., of Findlay, O., and it is a stock Adams truck, equipped with a special body, that is used in the hyper-dangerous business of conveying nitroglycerine from State to State, according to the field of operations of its owners. Only one change from stock equipment was made in the chassis, and that consisted in substituting Swineheart cellular non-skid tires for the plain-tread tires usually supplied with the truck. The body is stock, except that it has been slightly modified to meet the requirements of the work for which it is intended. The regular body is lined with a sheet-metal pan, in which rests a special body divided into a number of compartments, each compartment being of just sufficient size to hold a single can of nitroglycerine. The inner body also is fitted with a pan, to guard against any of the explosive liquid getting into the transmission elements of the truck. The top of the inner body is strengthened and forms a platform on which torpedoes are carried. They are held in place by means of side stakes attached to the outer body.

The full capacity of the truck is 720 quarts of nitroglycerine, though even part of a single quart would prove sufficient to blow the truck and the driver pretty nearly completely out of sight.



ADAMS TRUCK WHICH IS EMPLOYED IN THE HAZARDOUS BUSINESS OF TRANSPORTING NITROGLYCERINE

About Demagnetization of Magnetos.

If the reversal of the current in the armature of a magneto will demagnitize the field and render the apparatus useless, for the time at least, why does not the reversal of the field, or the bucking of a permanent field by a counteracting field, which regularly is done in order to secure regulation on lighting dynamos, cripple the dynamo? is a question that occurs intermittently. The reason is plain: The current operating the bucking field is but a part of the total output of the machine, and the field itself is so wound that when operating under full current strength the strength of its magnetic field is never so great as that of the main field. Consequently, as the bucking field never can be in operation save when the main field is at full strength, total demagnetization of the main field is impossible.

LIQUEFIED GAS FOR AUTOMOBILES

Government Chemist Shows Possibilities of Natural Gas for Internal Combustion Motors—Its Many Uses.

It is by no means beyond the bounds of possibility that the search for a fuel for internal combustion motors, when the price of gasolene rises to a height that will make it practically unattainable, will develop fuels that at present are given little consideration in discussing the fuel of the future. In this connection it is well known that experiments have been made with natural gas stored under moderate pressure and carried on a motor truck in tanks, being fed to the motor through a suitable valve and mixed with air in a simple mixing valve; and there would seem to be a considerable field, for experiment at least, in this direction, for the volumes of natural gas that go to waste are enormous, and the successful use of natural gas for vehicle propulsion might bring about appreciable economies. There is no question as to the cheapness of the gas itself, and the most serious item of expense would be the compressing and tanking. So far as power is concerned, the results obtained from the natural gas are said to be on a par with those obtained from gasolene, so far as can be judged from the operation of stationary engines.

Another step in this direction recently has been taken by Dr. Walter O. Snelling, of Pittsburgh, Pa., who is a consulting chemist attached to the United States Bureau of Mines and the Panama Canal Commission, and who has succeeded in

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liquefying natural gas by a process which is said to be commercially practicable.

"By the new method of rectifying the condensed portions of natural gas," he says, "it is possible to obtain a liquid gas, which seems quite ideal for the lighting of isolated dwellings, etc. In the liquid form the material exerts a pressure of but 500 pounds per square inch upon the container, and upon release of pressure it expans to 350 times its original volume, and each volume of the expanded gas is equal in heating power to four times its volume of coal gas."

While Dr. Snelling has carried on most of his experiments with liquefied natural gas with a view to its use for illuminating purposes, and is particularly interested in that field of utility, he has made experiments in the running of gas engines of both stationary and automobile types. Apparently there is no obstacle to its use in this way, for the results obtained are said to have been perfectly satisfactory. It is evident, however, that Dr. Snelling is eminently a practical man, for he refrains from dreams of the future and says: "As a good quality of gasolene would be more readily available at most places than would the new liquid gas, I am hardly inclined to believe that it will have a field of usefulness in automobile propulsion at present."

In the matter of the proportion of this gas which must be mixed with air to form an explosive mixture, the new fuel is not particularly elastic; the range is only from 3 per cent. to 7 per cent. Therefore, while the proper feeding of the gas for the purpose of running an engine is not a matter of any great difficulty, its use for motor starting purposes, where the method of procedure would be to force a small quantity of the gas into the cylinders already filled with air, would be of problematic success, because it would be extremely difficult to strike the right proportion. Acetylene, which has an enormously wide explosive range, is remarkably suited to this work.

As an illuminant for use in automoblie headlights, Dr. Snelling states that though the gas burns in an open flame with a fairly bright light, it is inferior to acetylene in this respect, and it is only when burned in a mantle that the best illuminating results are obtained. Experiments are in progress with a view to developing a mantle suitable for motor car work, but no definite conclusions have been reached as yet. Though the gas is natural gas, it is somewhat altered as to its characteristics in the process of liquefaction and the attendant purifying, so that when used with a mantle it is said to have eight times the illuminating power of natural gas and five times that of coal gas.

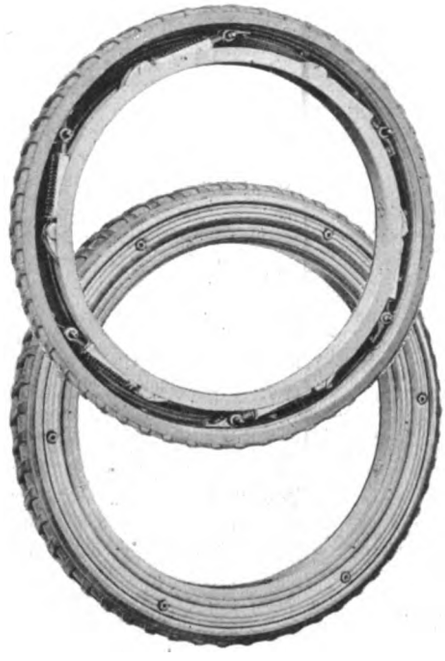
Rope as Substitute for Starting Crank.

A pull on a rope which has been wrapped several times around the flywheel and "clinched," ofter will start a motor when the crank has been lost or broken.

HERE'S ONE MORE SPRING TIRE

Hails from Kansas City and Cleveland—Employs Vanadium Steel Springs and Fits All Types of Rims.

Among the most recent additions to the already long and ever lengthening list of devices designed as substitutes for the pneumatic tire, is the Ferromatic tire, for the manufacture of which a company has been organized under the style the Ferromatic Tire and Manufacturing Co., of Kansas City, Mo., and Cleveland, O., with a capital of $180,000. The new tire, which differs little from a pneumatic of equal capac-



FERROMATIC SPRING TIRE

ity in size and general appearance, depends for its operation upon a combination of steel springs and rubber, and will be made to fit any standard type of wheel, including those for use with quick detachable rims, clincher rims and some types of demountable rims, without alteration of the wheel itself.

Two steel shells concentrically disposed, with steel springs interposed, form the tire, the outer shell having a peripheral covering of rubber, which forms the tread, and the inner shell taking the place of the ordinary tire channel. The rubber tread may be of a non-skid type, or of any desired form. Between the two steel members are placed vanadium steel springs, of helical form, varying in number from five to eight, according to the size of the tire, one end of each spring being connected to the inner shell and the other to the outer shell, so that the tendency of the car's weight to bring the shells together at the bottom is resisted by the springs. The weight of the Ferromatic tire is said to be not very much greater than that of a pneumatic tire of similar capacity.

Hartford Demonstrates Starting System.

By way of demonstrating the efficiency of the Hartford lighting and engine starting system, which is manufactured by the Hartford Suspension Co., Jersey City, N. J., famed as the producers of Truffault-Hartford shock absorbers, E. V. Hartford, who is the inventor of the devices, personally conducted a demonstration of the system in the building of the United States Motor Co., on 61st street, New York City, on Tuesday morning, 16th inst. Though the system was exhibited at the automobile shows both in New York and Chicago, this was the first time that it had been seen in actual operation on a car. The car on which the system was mounted was a six-cylinder 90-horsepower Thomas, and despite the diminutive size of the starter it "cranked" the big engine time and again without the slightest hesitation. In its entirety the system embraces a generator and a motor, which are separate, an automatic cut-out to disconnect the generator from the battery when the motor is stopped, and a storage battery.

The motor, which is barely more than 5 x 8 inches over all, is connected to the engine by means of a combination spur and worm gearing, and because of the great reduction obtained operates at exceptionally high speed, fluctuations in the load caused by the pistons passing compression centers being absorbed with the aid of a miniature flywheel mounted on an extension of the armature shaft. The starter may be connected to the engine either through the timing gears or through the transmission. The generator for use in charging the storage battery is separate from the starting motor and is operated from the pump shaft by means of a "silent" chain or a belt, whichever may be most convenient. After the demonstration, which was for the particular benefit of newspaper men and the officials of the U. S. Motor Co., several of whom, including Horace De Lisser and Alfred Reeves, were present, Hartford led his audience to Rector's, where a luncheon was served and several addresses of an informal nature made.

If Water Pump Should Be Disabled.

The breaking of a pump driving shaft or coupling, and consequent disablement of the pump, need not of necessity cause dismay, provided care is used. If it is possible, remove the members of the pump which prevent the free flow of the water through it. If this is not possible, disconnect the pump altogether and place a straight piece of hose between the radiator and the water jacket manifold. If the radiator is filled to the top, thermosiphonic circulation is set up, but the circulation is not nearly so fast as with the pump, so that the spark should be fully advanced and due caution exercised so that the motor will not overheat.

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FOLLOWING THE LINE OF LEAST RESISTANCE

Electricity Has an Even Chance with Gasolene in the Truck of the Future, Contends the Designing Engineer—Independently Driven Wheels Likely to be a Factor in Attaining Results—Gasolene Trucks Compared with Locomotives from the Point of View of Economical Operation.

"So that reporter fellow's been after you, too, has he?" said the Designing Engineer to his second assistant, as he endeavored to make room for his hat and coat on the office "tree."

"Looks that way," replied the second assistant, grinning. "I didn't know it at the time, though; I got talking to that fellow from downstairs, and I suppose he passed it on to the newspaper chap. Did I tread on the toes of any of your pet ideas?"

"Not a bit of it," assured the D. E. "You are looking at it the wrong way. The things I expressed were not in the nature of pet ideas or hobbies, or anything of the sort. It's just my opinion, from what I have seen of the motor truck business, that machines will be developed, as I said, along the lines of the machines now in use. Why not? It's along the lines of least resistance, and the progress of a great big industry isn't like the progress of an individual experimenting in a laboratory 'all alone by himself.' The individual will work along the lines that look best to him, until he sees something that appeals to him as being a whole lot better, and then he can chuck the old stuff into the scrap pile and make a brand-new start in the new direction. But it's hard to do anything like that when the whole world, more or less, has to be brought to a stop, turned round and started on another tack. You can convince some of the people, but you can't convince them all—not at once, anyway—and those who are unconvinced will do their best to prevent the making of more converts. Just imagine what a job it would be to get all the truck makers to abandon even part of their present plans and start doing things in a totally different way!"

"But you're not talking engineering at all," said the second assistant; "that's rank commercialism."

"Of course it is," assented the D. E. "I didn't say it was anything else. I said clearly that I was giving my opinion as to what actually would happen—not what I think ought to happen, or what I would like to have happen. Development has been proceeding on certain lines, and I believe that makers will stick to those lines for some time to come, rather than spend a whole lot of money experimenting in other directions."

"But that means getting into a rut," objected the second assistant.

"Nothing of the sort. Anything that is really good will be taken good care of. But you can't expect a whole industry to drop everything and turn to new ways all at once, no matter how good someone may think—or even prove—such ways to be. Someone has to do the developing first, put the machine to the test and prove its worth by years of service. And if it is a success, one of the first indications will be that the rest of the industry will immediately get to work to improve what already is in common use, so that there will be less margin for odious comparisons."

"That's about the way some of the poppet valve motor people have been doing since the sleeve valve began to get in its fine work," suggested the second assistant.

"Exactly. And you can see for yourself how poppet valves have improved of late. There's nothing like competition to bring out improvements."

"Don't you think, though, that the electric vehicle will have some sort of a place in the truck procession of the future?"

"Well," said the D. E., thoughtfully, "that's a thing that has been running in my mind a good deal since that newspaper fellow was up here and turned me inside out on the subject of gasolene trucks. Of course, there is no question about the electric motor itself; that's a thing that has been in use in so many different forms that it doesn't figure much in the line of trouble maker. Of course, there is room for improvement; you can say that about anything that's made—I don't care what it is. But it seems to me improvements are more likely to be made in the designing of vehicle motors of special forms, so that the drive can be more direct than usually is the case; for instance, a slow-speed motor built into a wheel, so that the hub forms the armature and the fields rotate with the wheel. That would do away with all kinds of gearing."

"Why, there's nothing new about that idea," said the second assistant. "I have seen a machine built about like that right here in New York, and there are a good many of them in use abroad."

"Sure—I know it. I'm not claiming to be the originator of anything. I'm simply following the same old idea of developing what we already have, which, it seems to me, is the most natural and likely way we can make progress. But even the man who builds motors of that kind acknowledges that they are not by any means perfect, for when it comes to a slow, heavy pull the rotative speed is so very low that an excessive amount of current is consumed without an adequate return in the shape of work done, and even on level ground the draw on the battery is pretty heavy, as compared with high-speed motors. But you can't say that that type of motor will not be developed to a point where it will operate economically and pull well running slowly; and when it can be made to do that it will be a mighty fine thing, without any doubt at all. In fact, in spite of the hard row they have had to hoe and the set-backs they have had, to say nothing of the shyness of the public in taking up anything that is radically different from most other things of the same class in use, I'm inclined to think there is a great future for the truck with each wheel independently driven, whether it drives through two wheels or four."

"Then it looks as though there might be a pitched battle for supremacy between electricity and gasolene—or what ever comes after it," suggested the assistant.

"Oh, there always will be lots of room for both, and there always will be people who will like one and not the other, as long as both are capable of doing the work required. But I do think the time will come when electric trucks will be used for long-haul work, which they can't do now; that is, speaking of electrics as a class. It's the old story—the limitation of a battery charge. But batteries are improving at a great rate, and it is possible to get much greater radius from a given weight of battery than was possible a few years ago. Suppose a battery is developed that will run a truck as fast as it is safe to run it and keep it going for a couple of hundred miles without recharging—a battery combining the good features of the best batteries now on the market and leaving out most of the trouble—can't you see what a tremendous boost the electric vehicle would get?"

"Yes," admitted the assistant. "But how are you going to do that? If you use a battery that's light, it's bulky, and if you use a battery that's compact, it's heavy, and a battery that would keep a heavy load running anything like a couple of hundred miles would be a load in itself."

"You will insist on forgetting," said the D. E., a little testily, "that I'm not pretending to say how these things are to be done. It's merely my opinion that the logical development lies in that direction."

"That's right," admitted the assistant; "I forgot. But what do you think," he added, "of the remarks I made to the man from downstairs? Doesn't it seem to you that there's a good deal in the idea of injecting

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water with the gasolene, and don't you think the carburetter is bound to give way, sooner or later, to a fuel injection system?"

The D. E. scratched his head.

"Well," he replied, "what I really think about the water business is that it is all right in itself, except that it adds complication, and the use of high compression makes finer and more expensive work necessary, and the driver has another set of apparatus to look after. But I don't think that matters much in motor car work, because I believe that the expense of fuel will be likely to stimulate the production of a cheaper kind of hydrocarbon rather than a more expensive and complicated kind of motor; and that fits in with your remark that when your pet ideas are developed we won't be using gasolene. As for fuel injection, I agree with you that it's bound to come, though I am inclined to believe it will be handled by keeping the fuel under constant pressure and admitting it by valves that can be regulated as to opening, or time, or perhaps both.

"I think there will be a great deal of compromising in evolving the motor car or motor truck of the future—especially the truck, which I have had in mind right along rather than the pleasure car. It will be something like the evolution of the steam locomotive, which now is pretty nearly as good as it ever will be, for probably it will be displaced by electric or internal combustion locomotives before it can be developed a great deal more. Take locomotives as a class: They are not the most economical steam engines that can be produced; they could be made more economical of fuel by adding complications. But on the other hand, they are not the simplest steam engines that can be made to do the work; they could be more simple, but not without a loss of efficiency. The locomotive is a compromise between maximum thermal efficiency with a lot of complication, and minimum complication with low thermal efficiency. In other words, it is so worked out that its entire cost from the cradle to to grave—rather, from the drafting board to the scrap-heap—including operation and repairs, will be as small as possible with relation to its earning capacity. It is the same with a motor truck. Maybe it will be possible to build a truck that will be a remarkable machine so far as its mechanical and thermal efficiency are concerned; but if the cost of construction runs so high that it balances the extra earning capacity, what would be the use? The user of the machine wouldn't be a bit ahead. In fact, a bad accident might put him a lot behind."

"Not unless he was idiotic enough not to insure the machine," interjected the assistant.

"Right; I forgot the insurance business. But that brings in another item—the higher cost of the insurance on a very expensive machine, which would help to bring up the expense of maintenance. My point is that the truck of the future ought to be a machine that will do its work with reasonable economy, but will be of extreme simplicity mechanically, comparatively inexpensive to manufacture and very unlikely to go wrong through the failure of any of its very few parts to operate properly. And it's a whole lot simpler to change the fuel to something cheaper than gasolene, and build the engine to suit, than to build a more expensive motor and then add complications as well, and still use the more expensive fuel. It's adding two evils to cure one.

"There's something else that has to be considered when you are talking about improvements in motor trucks," continued the D. E. "In forty or fifty years it is pretty safe to assume that roads and streets will be something very different from what they are to-day. Long before that, owners of motor trucks will have become very tired of having their machines banged to pieces on the abominable roads we have now, and manufacturers will be tired of trying to build trucks strong enough to stand the racking such roads give them; all so that money will not have to be spent on the highways. And long before that time the users and the manufacturers of motor vehicles of various kinds will be so numerous and so strong that they will be in a position to stand up and say what they want, and see that conditions are made what they ought to be. So trucks will have to be built to stand only occasional overstraining—not a continual performance, as at present. And that will to a very large extent remove the necessity for a governor, for there is no reason in the world why a truck should not be run just as fast as traffic and its own power will permit, if the roads are approximately perfect. On a long haul it would be folly to set a governor so that the machine would be held down to, say, twelve or fifteen miles an hour, with a long stretch of straight, smooth, sandpapered road ahead. It would mean throwing away time, which is money. Governors are the thing for the present, for there are practically no roads where it is safe to run a truck at any great speed; but roads are now built for horse speeds, and you might drive over a road with horses at their normal speed and take away the idea that the surface is very fine indeed, and then go over it with a motor car at its normal speed and think it an entirely different sort of road. And it really would be, for what is a good road for a horsed vehicle may be a bad one for the faster-moving motor vehicle."

"H'm," said the second assistant, thoughtfully, for he rode a motorcycle and was painfully familiar with a great many road surfaces. "There's a great deal in what you say about the roads."

"There certainly is; and if you want to get an idea of the difference in hauling a load over a good or bad road you ought to ride for awhile on an electric truck fitted with a volt-ammeter, and just note the difference in current consumption on different kinds of surfaces. It is surprising. You don't notice it much on a gas truck, because there's nothing much to indicate the differenve except the bumping and jouncing.

"And there's another thing that I think will be worked out in the not far-distant future. There is a very great difference in the amount of power absorbed by different solid rubber tires. The shape of the tire, its size and the composition of the rubber employed in its manufacture all have their effect in either wasting or economizing power, and naturally it's in the electric truck, with its meter, that this difference shows up, though, of course, it exists on any car, whether there is anything to show it or not. I have seen a truck run through a series of tests with tires of different kinds—all solids—to see what variation there was in current consumption. With absolutely no difference in loads or roads, and practically none in weather conditions, and using the same stretches of road all the time, there was found to be a variation of 20 per cent. in the power to drive the truck with the most economical and the least economical tires on the wheels. These figures were not extremes, but the average of a number of careful tests. Now, it seems to me reasonable to expect that tire makers some day will pay a good deal more attention to this matter than they do at present, though I know some of them already have gone pretty deeply into the matter."

"Don't you think that by the time the roads are sandpapered, and all that sort of thing, trucks will be carrying much heavier pay loads than they are now?"

"Undoubtedly. That's only reasonable. But then up comes the old question of the limit of endurance of rubber. You know rubber can be broken down, structurally, and made useless by excessive compression, just as it can be broken by excessive stretching or by cutting or tearing, so that it cannot be restored to its original condition. So, unless something better than rubber turns up, I don't see how the loads can increase very much. I do think, however, that there will be a great deal of development along the line of trailers or the semi-trailers that a number of manufacturers now are using. With these arrangements you can carry your power plant on rubber tires and the load partly or altogether on steel tires, with a corresponding reduction in tire expense, both in first cost and in up-keep. The semi-trailer plan seems to be coming more into favor all the time, and more makers are adapting their outfits to use it."

At this juncture the office boy ventured to call attention to the fact that there was a man waiting to see "the boss," and the D. E. and his assistant turned to see "that newspaper chap" scribbling away for dear life at the office boy's desk.

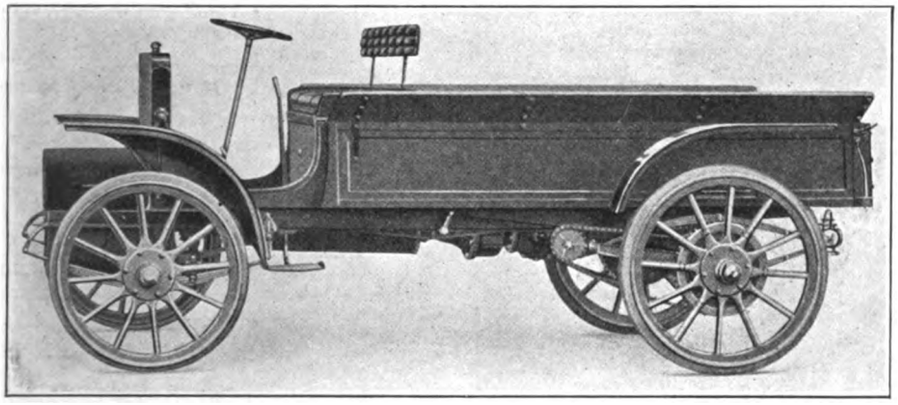
"Thanks," he said, edging toward the door. "I just came up to ask a few questions, but as you didn't pay any attention to me I made use of shorthand. I guess I got it all." And with a grin he departed.

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ANOTHER WAGON MAKER SEES LIGHT

And Seeing It, He Adds Motor Trucks to His Productions—Characteristics of the Geneva.

It is one of the signs of the times that manufacturers who long have been identified with the manufacture of horse-drawn vehicles are in many instances keenly alive to the fact that the motor vehicle for commercial work is nothing short of inevitable, and, rather than relinquish any part of their reputation for progressiveness, are taking up the motor car business. One such concern is the Geneva Wagon Co., of Geneva, N. Y., which just has entered the commercial motor car field with a light delivery wagon of particularly neat design. This Geneva wagon is built with two standard types of body—one an open express and the other a closed panel body. Only one type of chassis is built, having a two-cylinder motor with opposed cylinders, located under a short hood forward of the dashboard. Perhaps the most conspicuous feature of the car is the extreme accessibility of the motor. When the hood is removed the whole top and forward end of the motor are exposed and are easily reached by the operator from the front, between the wheels. Carburetter, magneto, force-feed lubricator, pump, valve mechanism and piping are all readily reached, without the necessity of leaning over or ducking under anything.



GENEVA DELIVERY WAGON WHICH EMPLOYS HORIZONTAL OPPOSED MOTOR

The motor is rated at 20 horsepower, having cylinders measuring 5⅛ x 4½ inches, and ignition is effected by means of a high-tension magneto mounted on the top of the motor crankcase, in a most accessible position. The cooling water is circulated by a gear pump through a radiator built up of vertical tubes, which forms the dashboard of the car and is thus exposed to air currents and at the same time is out of the way of accidental injury and does not interfere in any way with access to the motor. Control of the motor speed is effected through a throttle lever mounted in the usual position on the top of the steering wheel. The carburetter is a Schebler and is connected to the intake manifold at a point a little to the right of the middle.

Drive from the motor to the rear wheels is through a multiple-disk clutch, a two-speed planetary change speed gear and thence by propeller shaft to a jack shaft, which carries the differential and the sprockets, from which the rear wheels are driven by chains. The framing is of wood, double trussed, and is mounted on semi-elliptic springs in front and full elliptics in the rear; the rear springs are not required to take the driving thrust, substantial radius rods being provided for this purpose. Larger wheels are used in the rear than in the front, the diameter being 36 inches and 34 inches respectively, and the same holds good of the solid tires, which are 2 inches in front and 2½ inches in the rear. The wheelbase is 96 inches and the tread standard, 56 inches. Brakes are of the internal expanding type. Steering gear is irreversible and is controlled by a wheel mounted on a column that is slightly inclined. Both axles are of 1½-inch solid steel, and the wheels run on ball bearings. Ten gallons of gasolene can be carried in the fuel tank, which is placed under the driver's seat.

The open express body, designed as Type B and shown in the accompanying illustration, is 6 feet 6 inches long behind the seat and has a width of 3 feet 7 inches, while the full-panel body is of the same width but is 6 inches shorter, making its length 6 feet. With the open body the vehicle weighs 2,100 pounds, and with the full panel type 2,300 pounds. As its regular equipment, the wagon is supplied with two oil side lights, an oil tail light, a horn and a set of tools.

Armored Cable for Lighting Systems.

Flexible steel armored cable, commonly known as "BX," makes a very satisfactory and very serviceable connection for use with electric lighting apparatus. The wire, which may be had in all of the commonly used sizes, is well protected from mechanical injury and from the weather by the covering, and still is very pliable.

IMPROVEMENT IN THE PEERLESS LINE

All of a Minor Nature, but Making for a More Satisfactory Whole—Priming Pump the Only Novelty.

Following the custom inaugurated several years ago and adhered to ever since, the Peerless Motor Car Co., of Cleveland, O., is among the first formally to place before the motoring public the product of its factories—a line of cars, mounted on five chassis, which is just a step in advance of the line which it supersedes, and which at the present time marks the ultimate of perfection attainable in the eyes of its producers.

Consistent with Peerless policy, considerable attention has been devoted to little things, though none of the big things has been overlooked in the process, and the new cars exhibit no essential changes in construction beyond a slight rearrangement of some of the engine components and accessories. Thus, for instance, the fan now is driven by a built-up V-shaped belt instead of gears, and the lighting dynamo, which forms part of the Gray & Davis outfit, is driven from an extension of the fan pulley spindle instead of from an extension of the pumpshaft. Carburation has been made more efficient by the adoption of a new carburetter with a damper throttle instead of a piston throttle, and adjustments for both main and auxiliary air are made from the dash. Another carburetter refinement lies in the adoption of a new type of T-shaped intake manifold instead of the straight-through manifold which was used heretofore. The exhaust manifold also has been changed to correspond in shape to the intake manifold, the object being to permit of freer exhaust and eliminate back pressure.

The ignition system has been changed, and now is formed of a Bosch dual magneto and a single set of plugs, instead of the two independent systems which have been used in the past; a built-up high-tension distribution bar replaces the vulcanizer bar used heretofore and permits of neater wiring, with decreased liability to short circuits and wrong attachments of the terminals. Except for these changes, the five motors remain the same, the cylinders in each case being of the T-head type cast in pairs. The bores and strokes of the motors are as follows: "24-four, 4 x 4⅝; "40-four," 5 x 5½; "38-six," 4 x 4½; "48-six," 4½ x 6; "60-six," 5 x 7. A clever priming device has been added and is in the form of a small pump, which is housed in the chassis frame and operated by means of a lever extending through the frame below the radiator. To prime the motor it is merely necessary to turn a small dash lever, which connects the pump with the carburetter, when a few strokes of the pump handle suffices to inject a quantity of gasolene vapor and air

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directly into the intake manifold to facilitate starting. The transmission elements remain unchanged, and in each case embrace the Peerless cork-insert internal expanding clutch, four-speed change gear mechanism and arched full-floated rear axles. The brakes are internal expanding and external contracting, and are located on the rear wheels.

Body changes are few and embrace slight alterations calculated to increase the comfort of occupants of the cars and further accessibility. Domed electric side lights let into the dash have been adopted, and the windshield stays now are turned backward instead of forward, two features which go far toward increasing the already pleasing exterior appearance of the cars. Spare tires are carried on the running board as heretofore, but a depression has been provided, so that they set slightly lower and are more firmly held. Also, in order to increase the straight-line effect and permit a smoothly folded top that lies low, a new type of toggle rest has been adopted which holds the top firmly without danger of abrasion by chafing.

Taking Care of Kerosene's Added Heat.

When adapting a gasolene motor to the use of kerosene by means of a kerosene carburetter or gas producer, it is well to remember that unless some provision is make for additional cooling the motor will run hotter on kerosene fuel than on gasolene. If the piston should be rather a tight fit, this increased heat might possible cause binding, and in aggravated cases seizure. A larger pump should be supplied or the speed of the pump increased to prevent the rise in temperature. It is common practice where a motor is designed for use with either fuel to make the diameter of the piston .02 of an inch less than that of a motor of the same size designed for use solely with gasolene.

Copperplating to Stop a Leak.

Most carburetters of standard design are provided with a "butterfly" throttle valve. There are some, however, which have the "barrel" type of valve, and the constant movement of the throttle as the car is accelerated and retarded causes wear, which results in leakage of air around the barrel and consequent irregular running. About the best method of putting a carburetter so worn in perfect condition is to copperplate the barrel, depositing just enough metal to make the barrel fit tight.

Soft Solder in Place of Washer.

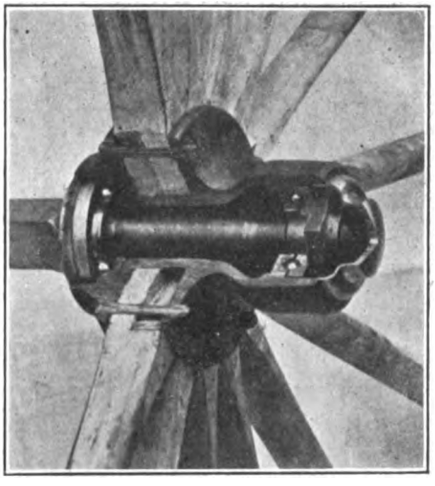
When the small rubber washer located in the valve cap, which serves to check the escape of air from the tire in case the check valve leaks slightly, has become worn out, a few drops of soft solder introduced into the cap will serve the same purpose, and moreover be more durable. The cap should be set down with a pair of pliers for the first time, so that the seat will embed itself in the soft metal.

CLAIMS A "FRICTIONLESS" BEARING

"Suspension Effect" Obtained by "Deflecting Line of Pressure"—Test With Rubber Balls to Prove Assertions!

Though the ordinary type of ball or roller bearing is to all intents and purposes frictionless, the fact remains that there is very slight friction produced, even though it is so slight as to be practically negligible. It has been the purpose of the Suspension Roller Bearing Co., Sandusky, O., however, to eliminate even this minute amount of friction, and to accomplish the result an unusual method of construction has been adopted, which, it is claimed, not only permits an absolutely frictionless annular bearing, but one which may be used to absorb thrust as well.

The bearings are styled the Boyer "suspension" bearings for their inventor, E. A. Boyer, who is the secretary-treasurer of the company which is exploiting them, and the peculiar method of construction is illustrated by the accompanying picture, from which it may be seen that the races, instead of being arranged concentrically, as is usual, are arranged side by side. In the ordinary type of annular bearings, not all the balls or rollers, as the case may be, carry an equal part of the load at all times. With the Boyer "suspension" bearing, however, it is claimed this difficulty is overcome by reason of the construction, which, it is explained by the inventor in his literature, "deflects the line of pressure of the load from the usual perpendicular or horizontal to that of an incline, thus throwing the usual line of the axis of the rotation of the ball from the right angle to the usual line of pressure, to that of an acute angle, thus causing the pressure to fall upon the side of the ball instead of the top or center, resulting in a suspension effect, with the load hanging on or suspended from the balls."



BOYER "SUSPENSION" BEARINGS

Not the least of the claims which are made for the bearings, which may be had in either ball or roller type, is that the weight is equally distributed over all the balls or rollers at the same time; as a matter of fact, it is stated that the bearings "still will perform properly should half the balls be removed entirely, for even then there would be twice as many bearing balls as are at one time performing in other bearings." It is further claimed that, by reason of the true rolling motion which is obtained, friction is absolutely eliminated. To such an extent is it eliminated that "but little oil is advised," and then only sufficient to prevent rust.

In order to demonstrate that because the load is equally distributed one defective ball or roller will not fracture, it is stated in the literature of the company "that rubber balls and rollers have been placed between the steel balls and rollers in the bearings, and they run as well as when all are steel balls or rollers." "This rubber test," it is summarized, "also proves that we have a frictionless bearing, as the rubber will not slide."

The Economy of Motor Fire Apparatus.

While it is unlikely that any progressive municipality would refuse to avail itself of the superior advantages of motor-propelled fire-fighting apparatus even if the cost of maintenance and operation were greater than that of horse-drawn apparatus, it is none the less gratifying that the cost figures out in a way that makes the older method look like an expensive luxury. Though it is generally known that these costs are so low as in many cases to appear almost ridiculous, the exact data are not often made public, which adds interest to the figures which represent the expense of maintaining the three motor fire engines in use in Roanoke, Va., for the five months ending March 1 last.

Gasolene and lubricating oil for the five months for the three machines cost $51.93 and minor repairs came to $34.40, a total of $86.33. The cost of maintenance for the six horses displaced by the motors would have been $450 for the same period, so the saving effected amounted to $363.67. To put it in another way, the horses would have cost more than five times as much as the motor apparatus, and these figures do not take into account repairs to horse-drawn apparatus.

"Acid Grounds" in Electric Vehicles.

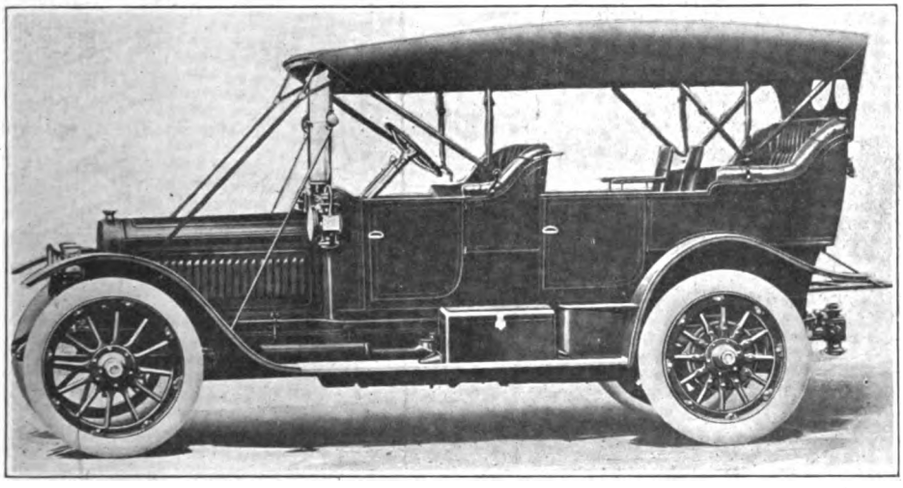
Very often a ground in an electric vehicle, particularly in the case of a large truck, is caused by the slopping of electrolyte, the moisture forming a path for the leakage of a very small amount of current. This is called an "acid ground" and is of no serious importance, and, in fact, often is very difficult to prevent. It cannot be traced to any particular place, and this fact, together with the small amount of current involved, is sufficient ordinarily to indicate what it is.

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LOZIER EMBRACES CENTRAL CONTROL

Which Means Left-Hand Steering Also—Triple Ignition Another of the New Features of Latest Models.

Having "felt out" the market with reference to the demand for a left-hand steering wheel, with centrally located control levers, the "feeling" being done with the aid of a closed car of the Berline type, which was announced late last fall, the Lozier Motor Co., of Detroit, Mich., figuratively speaking, has burned its bridges behind it and hereafter all six-cylinder cars at least which bear the Lozier name-plate will be of that order. Which change, together with the adoption of a new oiling system and a new ignition system, constitute the principal difference between the latest crop of six-cylinder Lozier cars, which are designated simply as Type 72, and their immediate predecessors. As heretofore, but two chassis will be produced—the new "six," which rates at 51 horsepower, and the "four," which remains substantially in its original form and rates at 46 horsepower. The prices remain unchanged, the smaller car listing at $4,600 and the larger one at $5,100, either price applying to any of five touring or roadster body styles.



LEFT HAND DRIVE LOZIER "RIVERSIDE" TOURING CAR

Though the new six-clinder motor is a duplicate of its prototype as regards bore and stroke, which are 4⅝ inches and 5½ inches respectively, it is practically a new motor throughout, the location of the steering wheel at the left side and the incorporation of the new oiling system necessitating several material alterations in design. The cylinders still are of the T-head type, which construction long has been a feature of Lozier cars, and are cast in pairs. In order to allow more room for the steering gear, however, the intake and exhaust manifolds have been reversed, as have the water pump and magneto. Coincident with these alterations, the valves and ports have undergone a general enlargement, the result being that though the engine is nominally rated at but 51 horsepower, the actual development on a brake test is in the neighborhood of 80.

Other minor refinements in engine design also have been made, such, for instance, as the incorporation of larger bearings in some parts and a general strengthening throughout. The most noteworthy change which has been made is in the oiling system, which has been altered with the intent not only to provide more efficient lubrication and greater economy, but also positively to eliminate the smoke nuisance, which constitutes a problem of no mean proportions. To this end the variable trough system, which has been used with conspicuous success in Knight engines, has been adopted.

Briefly, the system embraces a number of small troughs, one under each connecting rod big-end bearing, which are mounted on a longitudinal rod running the length of the crankcase. By means of suitable linkage, the rod is connected to the throttle lever in such a manner that as the throttle is opened the troughs are tipped upward, permitting the scoops on the connecting rods to dip deeper into the oil. The oil is placed in a reservoir in the crankcase, whence it is pumped into the troughs after first having passed through a screen. Thus there is always clean oil in the troughs for the scoops to dip into. The inside of the cylinders and the minor bearings are lubricated by splash, which system has been found to be entirely efficient.

As a direct outgrowth of the manufacturer's racing experience, the adoption of triple ignition in place of double ignition is expected to prove of as great benefit for ordinary touring in making available the maximum possible power as it has in racing. As heretofore, a Bosch magneto serves as the source of high-tension current and feeds two sets of plugs simultaneously, one set being located over the intake vales and the other over the exhaust valves. The magneto, however, is of the dual type, and in conjunction with a dry battery of three cells, provides a second and independent source of ignition. This second source of ignition is really a third system, however, inasmuch as either set of plugs may be used alone with the magneto, or they may be used together; only one set of plugs operates through the battery and dash transformer.

Another change which has been made, though it is largely in the nature of a refinement of detail, lies in the adoption of a Rayfield carburetter. The new device provides the greatest average carburetter efficiency over the complete range of engine speeds, and may be adjusted for varying climatic conditions, if such changes become necessary, by means of a lever on the dash, which controls the amount of gasolene in the mixture.

As regards the remainder of the car, no changes of a radical nature have been made, other than that wheel-rim sizes have been slightly increased to accommodate the over-size tire. Power is transmitted to full-floating rear axles through the intermediary of a multiple-disk clutch and the four-speed change-gear mechanism, with direct drive on third speed, is the same, except that the component parts have been slightly altered in position to accommodate the change to central control. The wheelbase is 131 inches and the springs are semi-elliptic in front and three-quarter platform in rear.

To the three styles of touring body which last year were included in the line—the Briarcliff, the Lakewood and the Riverside—there have been added three more bodies, making six in all. The new cars, which list with complete equipment, including demountable rims, lamps, tools, tire repair kit and jack, robe and footrails and tire irons, are the Knickerbocker, which is a closed car of the Berline type; the Meadowbrook roadster, which accommodates three passengers, one of them on a seat on the running board, and the Larchmont, which is a five-passenger touring car of conventional form.

Differential Gear Dates Back to 1826.

The differential gear which permits the driving wheels of a motor car to rotate at relatively different speeds has become so closely associated with the self-propelled vehicle that it is rarely thought of in connection with other types of mechanism. As a matter of fact, however, the differential gear is much older than the automobile, having been patented in England in 1826 by Henry Houldsworth, who devised it as an improvement in spinning machinery, its function being the maintenance of a uniform tension on the threads as they were wound on the bobbins. Apparently the first application to a self-propelled vehicle was made in 1862, when a steam car, designed by D. K. Clark and built by Carrott, Marshall & Co., of Leeds, was shown at the London Exhibition, where it attracted no small amount of attention.

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MAKING THE CYLINDERS LIKE NEW

Simple Method of Fitting Liners That Serve to Overcome Scoring and Wear —The Operation Made Plain.

Neither scoring nor uneven wear in cylinders are conditions that are rare, and in not a few cases loss of power and jerky running of the engine may be traced directly to either one of these causes. Fortunately, however, very slight scoring, or the wearing of the cylinders very slightly oval often may be corrected by the simple expedient of placing a small quantity of graphite in the lubricating oil. The graphite must be exceptionally finely ground, though, or it may not serve its purpose, which is to fill up the interstices or to round out the slightly oval spots. Occasionally when the scoring is very deep or the cylinders have become decidedly oval, such measures will not suffice, and it then becomes necessary either to fit new pistons, after having bored out the cylinders, or to fit the cylinders with liners or sleeves.

The latter operation probably is the cheaper of the two, and despite its apparent difficulty, is comparatively simple. Obviously, the pistons should first receive attention and should be trued up in a lathe to the size of the liner which it is proposed to insert in the cylinders. The cylinders should then be bored out to from 13/64ths to 15/64ths of an inch larger than the finished size of the pistons. The liners should be turned in a lathe from close-grained sleeve castings and finished outside .003 of an inch larger than the diameter of the rebored cylinders. They should also be turned with a slight taper at the lower end. The cylinders should then be expanded by placing them in boiling water and allowing them to remain until they are thoroughly heated. It will then be possible to slip the liners in place quite easily after they have first been smeared all over with a solution of sal-ammoniac and water. There will be no necessity for pinning the liners, for, having been shrunk in place, it will be impossible to remove them without breaking the cylinder castings.

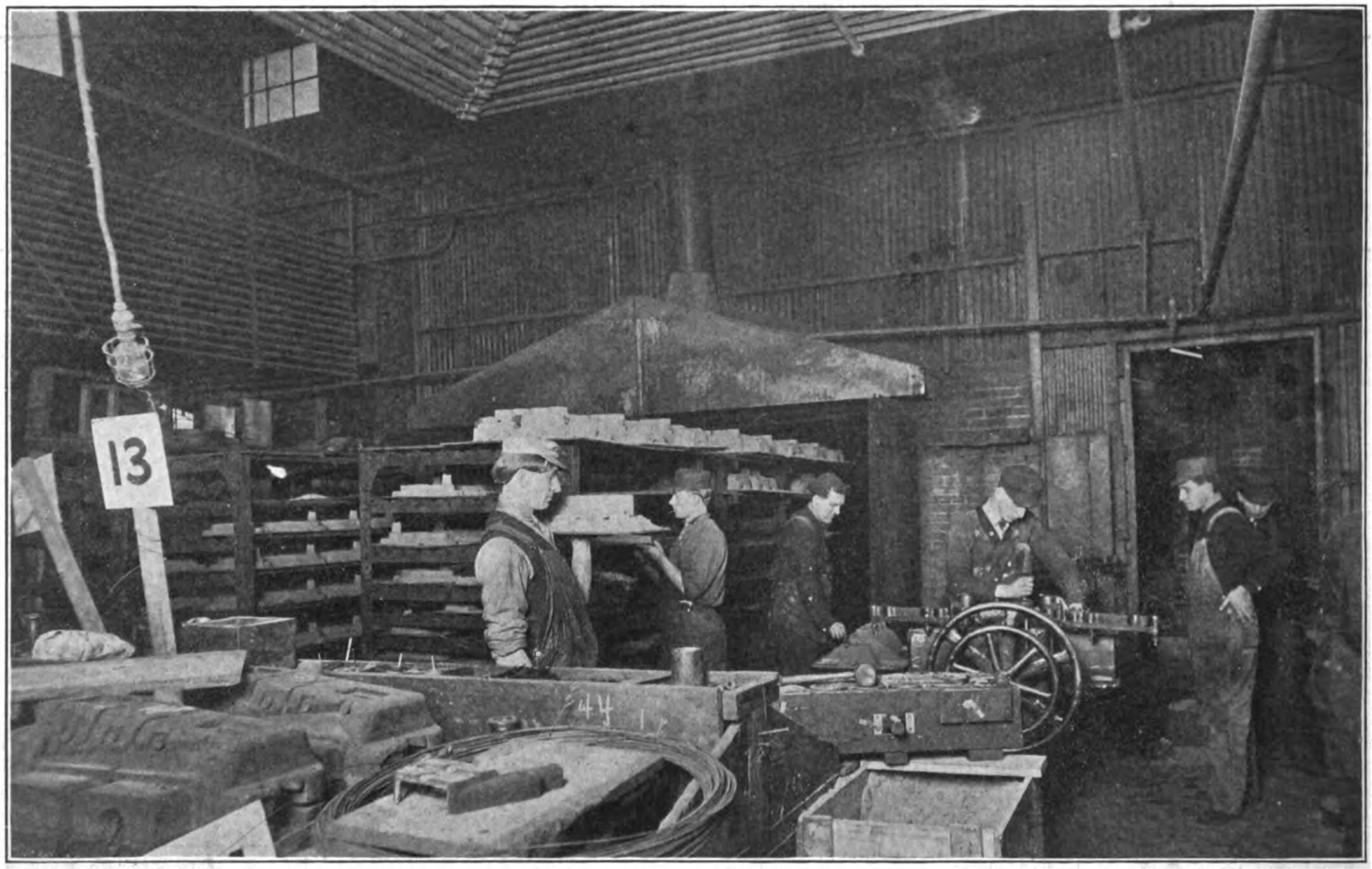
Indirect Illumination for Hupp Factory.

Indirect illumination systems, in which the light is first thrown upward and then reflected down, the lamps being concealed, are not uncommon, but it would appear that the Hupp Motor Car Co., of Detroit, is the first to apply the principle to the illumination of an automobile factory. In the new shops of this company the use of individual electric lamps has been eliminated, except in a few cases where concentrated light is required, by the installation of reflectors which hide the lamps from view but project the light upward and then downward in a soft, diffused glow, that not only is effective and lacking in sharp shadows, but avoids the annoyance due to the dazzling effect of naked lamps. The same principle has been adopted in the offices and stock rooms, supplemented in the latter case by occasional extension lamps where necessary.

Why Lubricating Oil Should Be Strained.

Although it rarely is done, the fact remains that it is the better part of wisdom to strain lubricating oil before it is put in the tank, not only to prevent the clogging of oil ducts and to eliminate the possibility of abrasive action due to foreign substances, but also to prevent foreign matter from getting into the pump. Such matter may cause the pump to stick and some part to become broken.

"BAKE-OVENS" THAT CONSTITUTE A PART OF THE EQUIPMENT OF MODERN AUTOMOBILE FACTORIES



HEAT TREATMENT OF STEEL, ONE OF THE MOST RECENT DISCOVERIES, AS PRACTICED IN THE R. C. H. FACTORY IN DETROIT

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RADICALITY IN FRICTION DRIVE

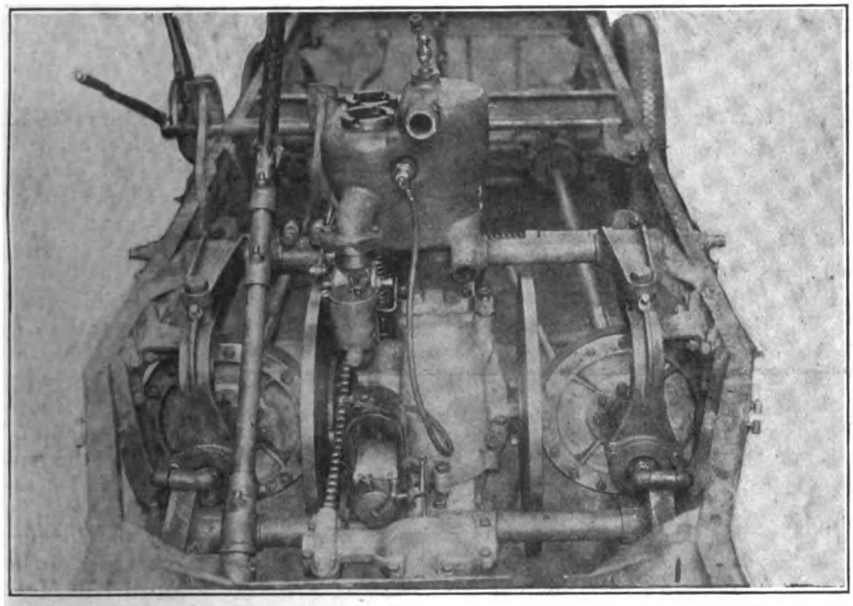
French Single Cylinder Production That Bristles With Amazing Features—Has No Flywheel and No Differential.

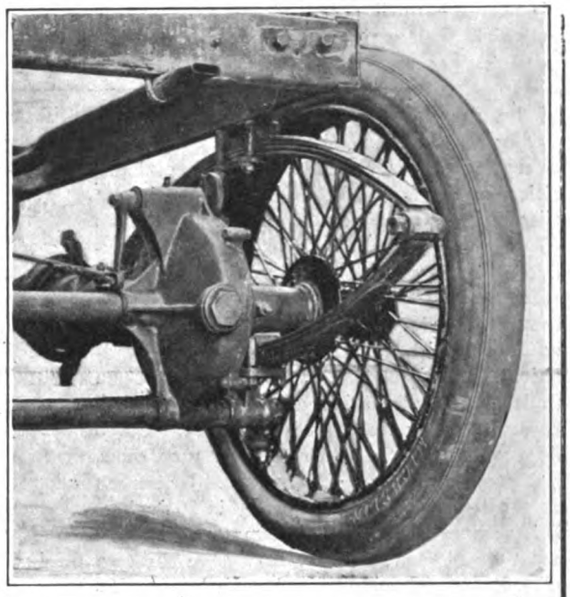
As outre as some French designs may be, to employ a French adjective—and some designs which are peculiar to say the least, as well as some very excellent ones, have come from the boards of French designers —it is a long time since a vehicle as absolutely unique as the Dumond car, which is illustrated herewith, has put in an appearance. Not only in one or two respects is the car unusual; it fairly bristles with features of a character that mark it as distinct from anything else that has been produced either abroad, where many of the radical departures from standard practice originate, or in America. Despite the radicalism of the car and its small size and power, however, that it has qualities that entitle it to recognition is evidenced by the fact that it completed the recently finished Tour de France without serious difficulty, a feat that was attempted without success by many larger and more powerful cars.

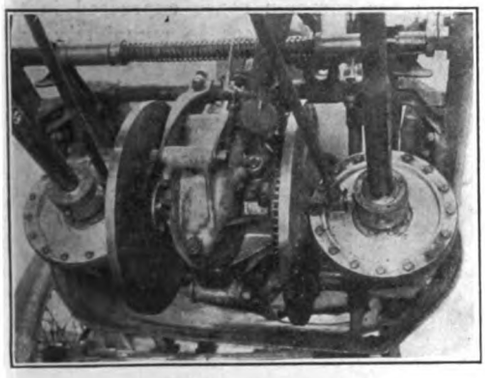
In its simplest aspect, the car is of the friction drive order, though the transmission elements are by no means as simple as those of some of the better-known friction-driven cars. For power, a single-cylinder L-head engine is used, and, contrary to the usual practice, it is arranged transversely in the chassis. Referring to the picture, it may be seen that the engine has no flywheel, as the word generally is understood. Instead, the two friction plates act as the flywheel, being made slightly heavier than is necessary merely to transmit the drive for this purpose.

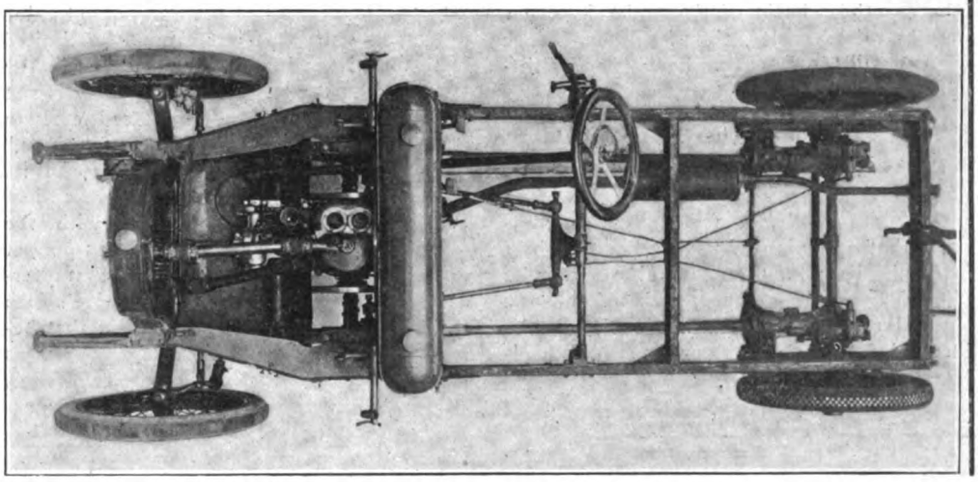
From the engine, power is transmitted to the rear axle by means of two propeller shafts, at the forward end of each of which are located the friction disks which press against the flywheel plates. By means of an ingenious system of linkage, which is best made plain with the help of the pictures, the friction disks on the propeller shafts may be withdrawn from contact with the driving plates simultaneously. The driven disks are slidably mounted on the propeller shafts, and to obtain the various forward speeds and reverse are moved toward or away from the center of the driving members by means of linkage similar to that which is in common use in American friction-driven cars. No differential is provided, nor is one necessary, for the simple reason that when the car is rounding a corner one of the friction disks slips slightly on its driving member.

Following the usual practice, two sets of brakes are provided, one set being located on the propeller shafts. The location of the other set is unusual, however, in that the brakes are placed within the casings that house the two bevel drives. Thus they are completely enclosed and are thoroughly protected. In the matter of rear spring suspension also the car is unusual, the lower halves of the springs, which are of full elliptic type, being attached below the









LOCATION OF ENGINE, SHOWING FLYWHEEL FRICTION PLATES
WORM'S-EYE VIEW OF FRICTIONS

UNIQUE REAR SUSPENSION
TOP VIEW OF CHASSIS SHOWING TWO PROPELLER SHAFTS

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axle. Instead of being attached directly to the axle, however, they are fastened to the axle brace, which forms a sort of second axle and carries the load.

Tiltings at Which Cars "Turn Turtle."

Though it is comparatively well known that the underslung type of car has slightly greater stability than the ordinary type of overhung car, there has been no lack of controversies over the relative stability of the two types. Neither type of car will topple over unless it is tilted at a considerable angle, though until recently the exact angle at which overturning might be expected has not been generally known. The tests which disclosed the fact were made at the factory of the Regal Motor Car Co., in Detroit, and demonstrated that the ordinary type of overhung car will return to its normal position on all four wheels provided it is not tilted sideways to an angle of more than 43 degrees; if that angle is exceeded, however, the car will "turn turtle." At any rate, that is the experience of the experimenters at the Regal facory, the car being equipped with a raised top and a windshield. Similarly, it was found that an underslung car, equipped with the same accessories, may be tipped to an agle of 60 degree 30 minutes before it will turn over, a difference of some 20 degrees. Inasmuch as the tread of a car generally is 56 inches, it is a comparatively simple matter to figure out that an overhung car may have the two wheels on one side raised a little over 38 inches from the road before it will capsize, whereas the wheels of the underslung car may be raised no less than 50 inches before the car will topple over. Each car was tilted until it balanced on two wheels.

Valve "Silencing" That Is Inadvisable.

It has been suggested, since the practice of enclosing the valve mechanism with a metal plate has become more or less common, that a section of rubber hose slightly larger in diameter than the valve spring be slipped over the valve springs of motors, the valves of which are not enclosed, the idea being to decrease the noise. It is needless to state that heat and oil are the two deadly enemies of rubber, and when acting in conjunction with the continual chafing of the valve spring, the very rapid disintegration of the hose would go a great way toward causing irregular valve action and consequent misfiring.

Why Carburetter Hole Should be Open.

The tiny little hole in the top of the bowl of a carburetter is put there for a definite purpose and should be kept open and free from obstruction. Its purpose is to equalize the pressure in the bowl with the pressure of the atmosphere and thereby prevent the possibility of a vacuum being formed in the bowl, which condition would seriously impair the efficiency of the carburetter. The hole is made very small to prevent the gasolene from slopping out, and should not be enlarged.

STILL BELIEVE IN POPPET VALVE

Two of Its Adherents Voice Their Sentiments—Commend Motor World for Its Article on Valve Mechanisms.

In any comparison of the poppet-valve motor with the non-poppet-valve motor, there are four factors which it is essential to consider. They are efficiency, as measured by the actual power output per unit of fuel; economy of operation, with due regard for both gasolene and lubricating oil consumption; simplicity of construction, and quietness of operation. Which, briefly, is the opinion of Nathan B. Wales, of Boston, Mass., expressed in commenting on an article which appeared last week in the Motor World, and in which the methods in vogue for quieting poppet valve mechanism was discussed under the title, "Quieting the Action of Poppet-Valve Mechanisms."

Though Wales has slightly overstepped the boundaries of the article, which was not intended as a comparison between the two types of engine, but merely as an exposition of some of the means which prominent manufacturers have adopted in quieting their poppet-valve mechanisms, he nevertheless raises several interesting points, and in the end comes right back to advocating further development of the poppet-valve mechanism as the real solution of the valve problem.

"The direct effect of the non-poppet valve on poppet valve design cannot be limited in terms of the increasing quietness in the operation of the poppet valve, which is not the main factor to be considered when a comparison, as such, is made between them," he writes. "The Knight engine, with its sliding sleeves, gives a perfect valve action, always in perfect synchronism with the cylinder at all speeds. Other non-poppet valves do the same, and it is this characteristic as compared to the poppet valve's cam and spring return valve mechanism that becomes the great determining factor, as shown in the power curves of the two types.

"The power curve of one of the oldest and best-rated makes of six-cylinder engines shows a maximum power point at 1,700 r.p.m., which is very good for the cam and spring-return operating mechanism of the present poppet valve. It will be noted also that the 'curve' starts to bend from a straight line, showing a decreasing rate of power developed, as compared with the increased r.p.m. at 500 r.p.m., while in contradistinction the power curve of a positively operated valved engine will maintain a straight line in its 'power curve' up to a far higher r.p.m., showing proportionally increased power with increased speed.

"What does this mean but that with a like bore and stroke as in a poppet-valve engine, a positively operated valved engine can be geared on direct drive to a ratio of 5 to 1, whereas the average poppet-valve engine is geared around 3 to 1. This is possible, as the positive valved engine can be operated through a wider range of r.p.m. so that it may come down to two miles an hour on high gear, and at the same time go up to sixty miles an hour without changing gear; moreover, operating under a 5 to 1 direct gear drive gives a 'feel' and 'hang-to' on a hill that would surprise the poppet-valve engine driver.

"Now, if a poppet valve, as such, could be operated in its intermittent action with periods of 'rest' and sudden movement by a positive valve mechanism which could operate through high ranges of speed without losing 'step' with the piston and without the flutter as now seen in the cam and spring-return mechanism at high speeds, we then would have made a great step in advance, for we would have a positive operated valve, as in the Knight, combined with a type of valve that is essentially simple and can operate without constant lubrication."

Nor is Wales alone in his opinion as to the direction in which it is best to look for that perfection of valve mechanism toward which all are striving. H. A. Moyer, of Syracuse, N. Y., whose carriages have made a reputation for themselves that bids fair to be equalled, if not excelled, by the reputation of his automobiles, also holds that in the poppet-valve motor there still remains excellent material for development.

"I have noted with a great deal of interest your article in the April 11th Motor World on 'Poppet-Valve Mechanism,'" Moyer writes, "and also your editorial on the poppet valve. I am particularly pleased with the common sense expressed in the editorial, as it agrees so completely with my theories and opinions on the poppet-valve motor.

"I have often made the remark that the manufacturers of the other kinds of gasolene motors ought to have made a good poppet-valve motor before they took up anything else, and I think it will be found that it will be a long time before they will get any poppet-valveless motors that will cause to be discarded a good, carefully built poppet-valve motor. I am manufacturing for my cars a new poppet-valve motor that is built with every possible care and as fine as can be produced."

With regard to poppet-valve mechanism in general, Moyer adds: "It is a great deal more sensible and decidedly simpler than the complicated mechanism of a sliding valve system. With a poppet-valve mechanism that is made with every possible care, and just as fine as it is possible to make it, as satisfactory results can be obtained as anything that has as yet been developed in any other type. I feel that time will show that this principle of a gasolene motor will not be discarded in favor of anything that has as yet not been developed. As in the words of your editorial, 'The poppet valve motor can be made, and is made, as silent and as efficient as can be desired.'

"I therefore want to congratulate the

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Court Stops Slow-Going Undertakers.

It would look very much as though the Louisville (Ky.) Funeral Directors' Association, affected by the pace of its funerals, was lagging behind the times, for not long since it passed a solemn by-law prohibiting the use by its members of motor cars for business purposes. While the association as a body might have been lacking in appreciation of motor vehicles, there was at least one individual member, L. D. Bax, who did not scruple to add one to his equipment, whereupon the association threatened him with suspension, in accordance with the rules and regulations. Failing to see the matter in the same light, however, Bax took the matter into court, which just has granted him an injunction perpetually restraining the slow-going association from interfering with its ultra-modern member.

"Doctor" Whose "Practice" Was Peculiar.

That Dr. Alan T. Gentry, of Morristown, N. J., made a business of selling stolen motor cars, is the charge lodged against him by the detective department of the Jersey town. The physician was arrested by the police late last week, after a serious accident, and now is held under $15,000 bail. He was known in Morristown as a doctor who preferred not to practice his profession, although he treated a few patients, and most people knew him better as an automobile salesman. The cars he sold, however, are said to have been stolen in Philadelphia, Hoboken and various other neighboring cities, where, according to the testimony of some chauffeurs, he was known as "Williamson."



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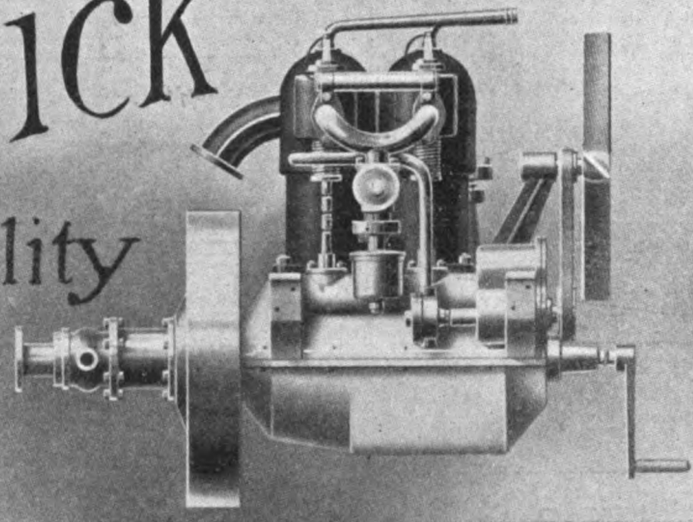
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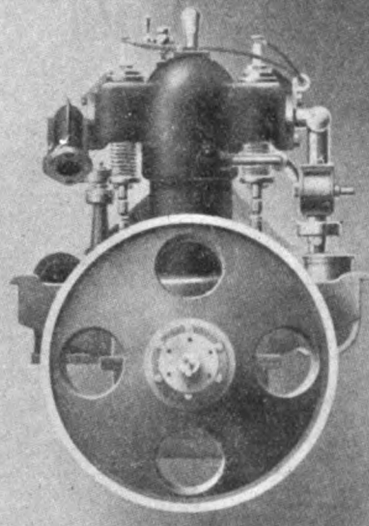
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Jencick Quality





POUND for pound, the commercial truck engine must possess greater endurance than the pleasure car motor. This is the policy back of Jencick design and construction.

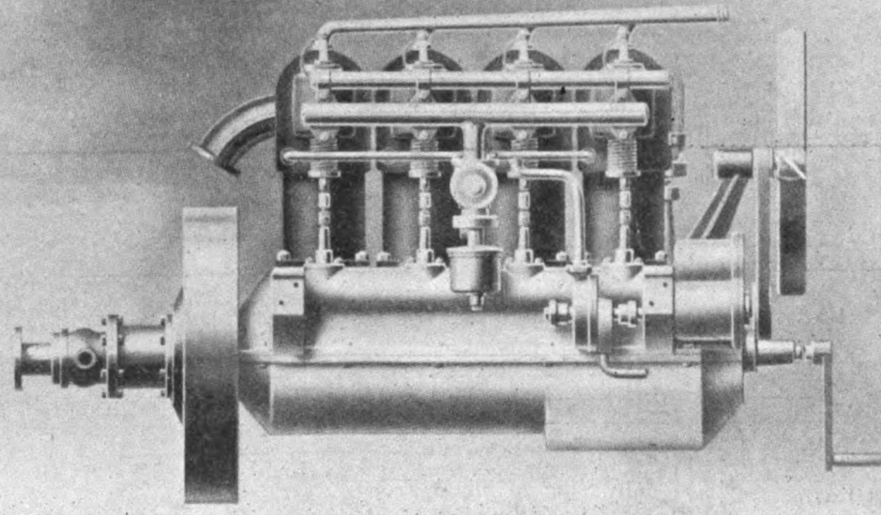
Jencick motors are simple, powerful, silent, flexible—not in promise, but in every-day performance.

SPECIFICATION OF AUTO TRUCK MOTORS

Type	No. Cyl.	Bore	Stroke	H. P.	Weight, Lbs.
A	2	4.5″	6″	12-15	350
B	4	4.5″	6″	25-30	475
C	4	5″	6.5″	40-45	565
F (Spec.)	4	6.25″	8.75″	70-80	800

Jencick Motor Corporation

PORTCHESTER, N. Y.



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1,004,836. Air Cooled Explosion Engine. Alven E. Walcott, Lowell, Wash. Filed Dec. 1, 1909. Serial No. 530,825.

1. In an explosion engine, the combination with an explosion cylinder and piston working therein; a compression or circulation cylinder of larger diameter than said explosion cylinder; a passage connecting said cylinders to convey the cold compressed air from the compression cylinder to the explosion cylinder when the passage is opened; and a piston formed integral with the piston in said explosion cylinder and fitting said compression cylinder whereby a greater volume of cold air is forced into the explosion cylinder than is displaced by the piston therein.

1,004,850. Windshield. Joseph Cogil, Central City, Neb. Filed Mar. 23, 1911. Serial No. 616,548.

1. In a windshield, a body frame and a head frame, means for hingedly connecting said frames together, a frame covering for said frames, a transparent member carried by the frame covering over said head frame, and means for suspending the aforesaid parts on a user.

1,004,867. Vehicle Tire. Samuel H. Gilson, Salt Lake City, Utah, assignor of one-half to Jay S. Milner, Salt Lake City, Utah. Filed May 2, 1911. Serial No. 624,671.

1. In a vehicle tire the combination of a metal band having peripheral flanges thereon and forming a shoulder near each edge of said band, a disk band adapted to fit on each of said shoulders, transversely alined slots cut in said disk bands, the outer edges of said slots being tangential to said metal band, concentric resilient bands adapted to fit between said disk bands, transversely placed lugs firmly secured around the outer of said resilient bands, sleeves on the outer ends of said lugs adapted to move within said slots, a plurality of transversely placed lugs on the other resilient bands, and a laminated tread engaging the lugs on and firmly secured to the outer of said resilient bands.

1,004,895. Tire. De Witt Nelson, Minneapolis, Minn., assignor to E. J. Phelps, Minneapolis, Minn. Filed Jan. 19, 1907. Serial No. 353,152.

1. A tire of the character set forth, comprising a series of corresponding sections, reinforcing plates applied to the opposite sides of the sections, and second plates secured to the reinforcing plates and carrying means for detachably connecting the sections.

1,004,907. Automobile. Charles F. Rodin, San Francisco, Cal. Filed Apr. 11, 1910. Serial No. 554,819.

An automobile having in combination two pairs of wheels, located near the rear and two pairs near the front of the machine, turnably journaled transverse shafts, and transmitting mechanism to rotate all the shafts in unison, the rear shaft having immovable bearings and having wheels fixed to its ends, the center of said wheel shaft being the radial point upon which the frame swings bodily, and the other shafts having jointed extensions to which the bearing wheels of said shafts are secured, rocker arms fixed to said jointed wheel shafts, a steering mechanism, a longitudinally journaled shaft turnable in unison with the steering wheel, rocker arms fixed to the longitudinal shaft and decreasing in length from the front to the rear, and connecting rods between said shaft and the rocker arms of the turnable wheels, whereby said wheels may be proportionately turned independently of the rear pair of wheels.

1,004,950. Tire. Howard O. Wilson, Ainsworth, Neb. Filed Dec. 3, 1910. Serial No. 595,398.

1. A wheel having a substantially cross sectional U-shaped felly, a tread member also of a substantially U-shaped cross sectional formation straddling the felly, resilient members positioned between the sections, spokes for the said wheel, the inner face of the said felly being formed with a plurality of doors adapted to provide means whereby access to the resilient members may be had for the purpose of repairing the same, each of the said doors positioned between the spokes, and a means to retain the doors in locked positions.

1,004,953. Automobile Headlight. John H. Adams, New Haven, Conn. Filed Feb. 18, 1911. Serial No. 609,283.

1. In an automobile headlight, the combination of a clip applied to the axle, a lamp bracket mounted to turn about a vertical axis, a connection between the lamp bracket and rod connecting the arms of the steering knuckles, said connection comprising separable parts, one of which is adapted to be supported in the aforesaid clip when disconnected from the other part, and a fastening for detachably connecting the parts of the connection.

1,004,964. Dirigible Headlight. George John Baker, Republic, Pa., assignor of one-half to Peter Lacey, Republic, Pa. Filed June 30, 1911. Serial No. 636,164.

1. In a dirigible headlight for automobiles, the combination with side frames, an engine hood, and the wheel spindles of the automobile, of converging arms supported by said frames and said hood, a yoke carried by the forward ends of said arms, a post revolubly mounted in said yoke, lamp brackets detachably mounted upon said post and adapted to support a lamp, a sprocket wheel mounted upon said post within said yoke, inwardly projecting arms carried by said wheel spindles, and a flexible connection between said arms and including a sprocket chain passing around said sprocket wheel.

1,004,966. Demountable Rim. Frederick R. Barker, Boston, Mass. Filed Aug. 19, 1910. Serial No. 578,045.

1. The combination with a wheel, of a rim, a gear, a pair of racks oppositely meshing with said gear, means operated by said racks for securing said rim to said wheel, a ratchet connected to said gear, a pawl engaging said ratchet, a lever on which said pawl is mounted to move relative to said lever and bodily with respect to said ratchet, and means to normally lock said lever.

1,004,973. Automobile Steering Mechanism Lock. George W. Benton, Finley, N. D. Filed Jan. 26, 1911. Serial No. 604.803.

In a device of the character described, the combination with the steering mechanism, front axle and steering knuckles of an automobile, of a toothed bar fixed on said axle, a movable toothed bar connected to one of the steering knuckles, and means for forcing the teeth of the movable bar into engagement with the teeth of the fixed bar, whereby the movable bar is locked against movement under the influence of the movement of the steering knuckles to which it is connected.

1,004,979. Internal Combustion Engine. Otto Leo Borner, London, England. Filed Sept. 23, 1907. Serial No. 394,087.

1. Means for expelling products of combustion from a two-stroke cycle internal combustion engine, comprising a main inlet through which part of the charge is admitted to the engine cylinder, an auxiliary inlet through which the remainder of the charge is admitted at predetermined variable times and separate means for controlling said inlets.

1,004,984. Gas Engine Starter. George Buress, Indianapolis, Ind., assignor of one-half to Robert Long, Indianapolis, Ind. Filed Nov. 18, 1909. Serial No. 528,690.

1. In an automobile, the combination with an engine, an engine shaft, and a fly wheel adapted to actuate said shaft, of an annular ratchet on the side of the fly wheel, a bell crank lever mounted beside said ratchet, a pawl pivoted to one arm of the bell crank and adapted to engage the ratchet, means connected with the other arm of the lever for actuating it, a spring for returning said lever and pawl to their normal positions, and a pawl for engaging the ratchet and preventing backward movement thereof, substantially as set forth.

1,004,986. Safety Valve for Pneumatic Tires. Bruce Burkett, Burkett, Tex. Filed Jan. 18, 1911. Serial No. 603,326.

In a valve structure of the class described, a casing, a valve seat therein at one end, an adjustable member engaged with the casing at the opposite end, a hollow stem extending through the casing and movable in the adjustable member and having an outer portion extending beyond the adjustable member, a cap removably engaged with the outer portion of the stem, the inner portion of the stem being interiorly threaded, an upwardly projecting exteriorly threaded portion formed integral with the said valve and threaded into the said stem, a spider formed integral with and interiorly of said upwardly projecting portion, a valve carried by the spider, a spring located in the casing and adjustable between the adjustable member and the valve and operating to normally hold the valve closed against the said seat, said valve having a central valve seat therein, an inwardly opening valve movable in the first valve, a stem carried by the second valve and extending through the spider, a nut adjustable on the second stem, and a spring interposed between the spider and the nut and operating to hold the second valve normally closed against the seat in the first valve, the said casing having a portion immediately adjacent the valve seat of a diameter greater than the diameter of the first valve and formed with a passage.

1,004,988. Vehicle Wheel. John Callan, Globe, Ariz. Filed Dec. 1, 1910. Serial No. 595,087.

1. A wheel comprising a hub, a cushion encircling the hub, a rim having recesses in its inner periphery, plates fastened to the rim over said recesses, said plates having sockets which open into the recesses, spokes, heads carried by the spokes adjacent to their outer ends, said heads seating in the sockets of the aforesaid plates, and the ends of the spokes extending through said sockets into the recesses of the rim, and shoes carried by the inner ends of the spokes, said shoes engaging the aforesaid cushion

1,005,021. Resilient Wheel. Vicente Gil-Delgado y Olazabal, Madrid, Spain. Filed Oct. 27, 1908. Serial No. 459,694.

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A resilient wheel comprising outer and inner disks of equal size arranged parallel and co-axial with each other and provided with slots, radial ridges on the outer face of the outer disk and forming inwardly disposed shoulders, a ring resting against said shoulders, a movable member arranged between said disks, radial slots in said member, crossing the slots of the disks, studs passing through said member and engaging in said slots, a hub having a flange and passing through the center of said member, bolts passing through said flange and member, a rim on said bolts, sleeves on said bolts and holding said rim spaced from said member, a tire on said rim and engaging said ring, and screws radially adjustable at their ends in said slots for limiting the movement of said studs.

1,005,035. Tachometer. Max Hoeft, Berlin, Germany. Filed Aug. 19, 1908. Serial No. 449,295.

1. A printing device to record the speed of a vehicle and the like, comprising in combination, type wheels operated in accordance with the speed of the vehicle, mechanism to print from said type wheels, a mechanical part continuously moved by the vehicle, and means to couple said mechanical part with said mechanism, substantially as, and for the purpose, set forth.

1,005,041. Antifriction Bearing. Charles O. Johnson, Boston, Mass. Filed June 30, 1909. Serial No. 505,130.

1. In an anti-friction bearing, the combination with an axle, of a cage surrounding the axle and comprising two connected rings each having a ball-receiving groove in its outer side face and each having ball- receiving openings through the inner wall, a washer in the bottom of each groove, bearing rollers situated between the rings and provided with recesses in their ends, balls received partially in the recesses in the ends of the bearing rollers, and a series of balls in the ball-receiving groove in the outer side face of each ring.

1,005,045. Starting Device for Internal Combustion Engines. Robert Owen Le Baron, Portsmouth, Ohio. Filed Jan. 25, 1911. Serial No. 604,520.

1. In a starting device for internal combustion engines a conduit member having two branches, a valve for connecting one of the branches with the other, and with the conduit, one at a time, a second conduit connected with the first conduit, and a check valve in the first conduit between the first-mentioned valve an dthe second conduit.

1,005,080. Supplemental Seat for Motor Cars. George H. Storm, New York, N. Y., assignor, by direct and mesne assignments, of one-half to Philip Willoughby Masi and one-half to Cora Sinclair, New York, N. Y. Filed Feb. 14, 1911. Serial No. 608,552.

1. A supplemental seat for a motor car having a running board, comprising a horizontal bar having inturned end portions capable of connection with the car to leave an interval between said bar and said car, a seat having lengthwise-adjustable pivotal connection with said bar, and a standard having a lower inturned forked end capable of detachably embracing the edge of the running board and an upper forked end capable of detachably embracing the outer frame bar of said seat.

1,005,103. Wheel. Thomas S. Chestnut, Buffalo, N. Y. Filed Dec. 29, 1910. Serial No. 599,855.

1. A wheel comprising a hub, a rim, a plurality of thrust receiving and transmitting load sustaining spokes arranged tangentially of the hub and connecting same with the rim, and a plurality of draw spokes connecting the rim and hub, whereby the former may be drawn toward the latter and the load sustaining spokes tightened.

1,005,118. Method of Operating Internal Combustion Engines. William Rabsilber, New York, N. Y. Filed Nov. 21, 1910. Serial No. 593,337.

1. A method of operating an internal combustion engine which consists in running the engine by compressing and burning in the combustion chamber thereof carburetted air and thereby energizing the piston and warming the walls of the combustion chamber; subjecting fuel to the heat of combustion generated in the combustion chamber; reducing the carburization of the air to a degree so low that preignition cannot take place at high compression; increasing the compression to a high degree; and injecting the preheated fuel into air in a highly compressed state in the combustion chamber, after the walls of the latter have been warmed.

1,005,121. Circuit Interrupter. Christian Aalborg, Wilkinsburg, Pa., assignor, by mesne assignments, to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a Corporation of Pennsylvania. Filed Oct. 7, 1908. Serial No. 456,579.

1. In a circuit interrupter, the combination with stationary and movable contact members, of a liquid-containing casing in which the members are disposed having an enlargement at the surface of the liquid for increasing the cross-sectional area at this point.

1,005,135. Windshield. Arthur L. Banker, Pittsburgh, Pa. Filed Dec. 18, 1907. Serial No. 406,969.

1. The combination with a sectional windshield, of means for hinging the opposing side frame members together comprising at each end a pair of co-operating transverse blocks hinged together at one of their ends and means for securing the other ends together comprising a locking lever pivoted to one block and having an inclined camming surface adapted to engage the end of the other block and a screw extending through the said lever and bearing at one end upon the side frame member for securing the lacking lever in locked position.

1,005,136. Windshield. Arthur L. Banker, Pittsburgh, Pa. Filed July 15, 1910. Serial No. 572,204.

1. In combination in a windshield, a lower frame member, a bearing block at each side thereof having a recessed face and a glass clip to the rear of the recess and projecting above the face of the block, a glass carried by the clips, an upper frame member, a bearing block at each side thereof hinged to the opposing bearing block on the lower frame member and having a recessed face and a glass clip to the front of the recess and projecting below the face of the block, a glass carried by the clips, and means for holding the shield in upright position.

1,005,170. Running Gear for Motor Vehicles. David M. Dearing, Jackson, Mich. Filed Nov. 12, 1909. Serial No. 527,623.

1. In a running gear for vehicles, a front supporting axle, a supporting frame terminating at the inner side of said axle, a substantially Y-shaped cross head with the shank thereof rotatably mounted in the forward end of said frame and with the arms arranged in horizontal position and yielding connections between said arms and said axle, said connections being arranged on opposite sides of the center of the axle and radius rods connecting said axle with said frame.

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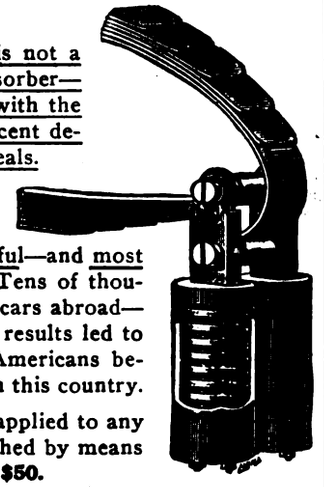
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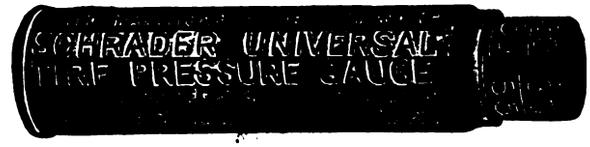
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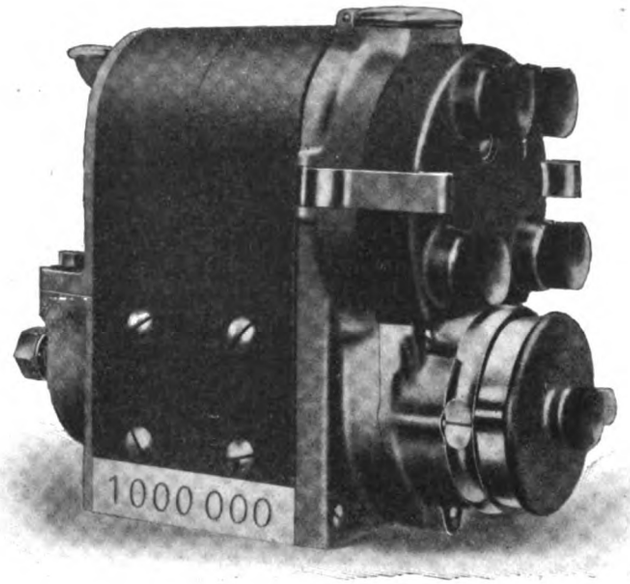
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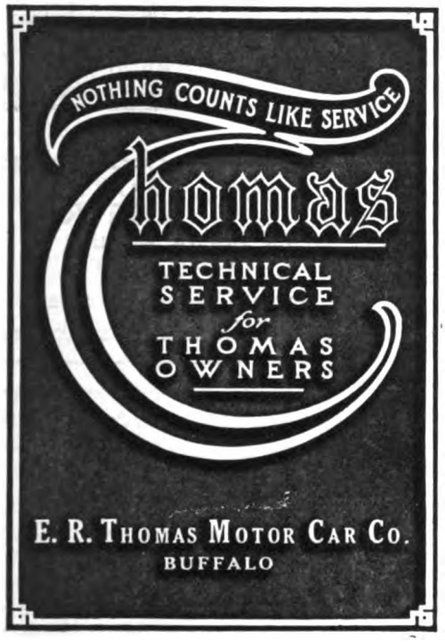
FINE AUTO for $750; guaranteed worth the money. W. J. McCRAY, Denton, Texas.

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FOR SALE—Mitchell Six—Cutting Forty. For information, address OWNER, 119 Railroad Ave., Carnegie, Pa.

MANUFACTURERS of Automobile Accessories—We propose opening a first-class supply store on June 1. Please submit proposition of whatever you have to offer us on a consignment basis. REO SALES AGENCY, Charleston, W. Va.

WANTED—First class man thoroughly posted on Automobile Sundries—one competent to manage Sundry Department for large firm. Give reference, age and salary wanted, and past experience, which will be treated confidential. Address OMAHA RUBBER COMPANY, Omaha, Neb.





Push Over Valve
Press the Lever and It's Tight
Simple, Isn't It?

Grab Pump Connection

25c. at All Dealers or
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$495.00 METZ 22 H. P. MOTOR CAR

The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.

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UNITED STATES TIRES

are made with all the secrets of manufacture and all the elements of strength that four great manufacturers know.

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will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
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Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.

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Mosler Spit-Fire Are The Best

The Bush Radiator

THE BUSH MANUFACTURING CO.
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MOTZ Cushion Tires

For Utility and Pleasure Cars

Send for Pamphlet 58

THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

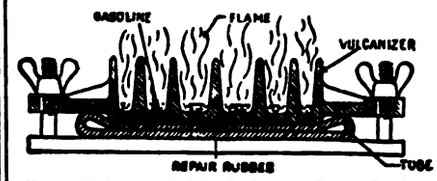
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2035 Michigan Ave., Chicago — 600 E. 15th St., Kansas City
Standard Tire & Rubber Co., 100-102 Portland St., Boston, Mass.
Distributors for New England States

It's New But Already It's a Necessity

The quick and easy way to repair the inner tube. A little rubber and one ounce of gasoline.

The Imperial Vulcanizer Repair Kit

"makes it right" in 15 minutes



Nickel Plated **Weighs 3 Lbs.** **Patent Pending**

Price $3.50 Complete

At your dealer's, or sent by express.
Guaranteed to Satisfy
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THE McGRAW TIRE & RUBBER CO.
East Palestine, Ohio

Kelly-Springfield Automobile Tires

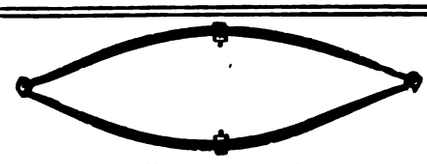


are as much better than other tires as you would naturally expect tires bearing the name Kelly-Springfield to be.

KELLY-SPRINGFIELD TIRE CO.
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Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.

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Weed Chains

ABSOLUTELY PREVENT SKIDDING

Cannot injure tires because they creep

Continually shift their position on the tire.

Attached in a moment without the use of a Jack or other tools.

Weed Chains on the front wheels give comfortable easy steering—no cramped fingers—no cramped arms—no sore muscles.

Out of car tracks, ruts, snowdrifts and heavy going; just like steering on smooth roads.

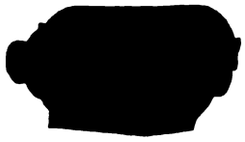
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made for easy installation on any motor car.

When you have one on your car your lighting troubles will be over. Write us today, giving make and model of your car. We will recommend an outfit exactly suited to it.

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SPECIALISTS IN
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THE SPRINGFIELD TOP
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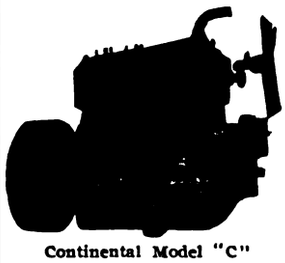
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We have looked after the quality behind it.
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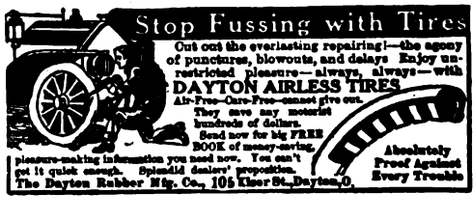
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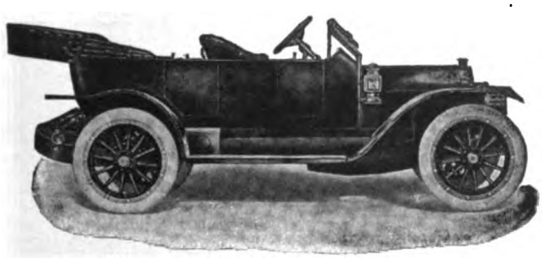
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Heavy Car Type
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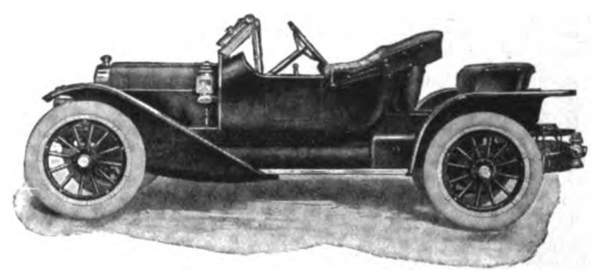
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Offer the Utmost in Automobile Value



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Model R, 40 H. P., Raceabout

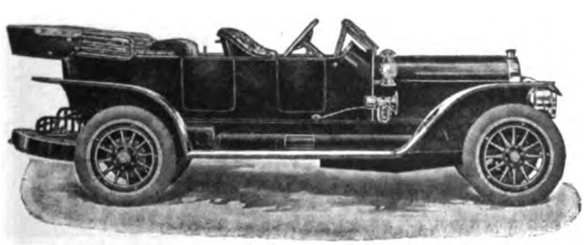
A high grade line of cars built for lasting service with the most luxurious appointments and thorough equipment.

Knox cars are a manufactured and not an assembled product. They are built in accordance with the highest manufacturing standards by a Company that never believes a sale is completed until each car has given its full measure of satisfaction.

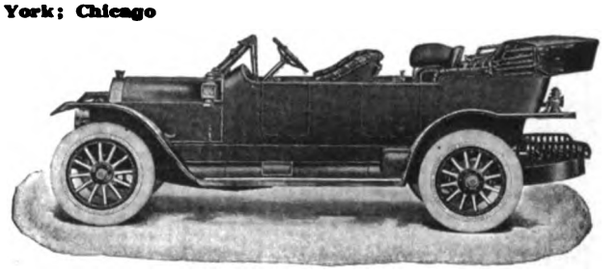
Our illustrated booklet "Knox Motor Cars" mailed on request.

KNOX AUTOMOBILE COMPANY, Springfield, Mass.

Branches—New York; Chicago



Model S, 60 H. P., Torpedo



Model R-45, 40 H. P., Touring Car

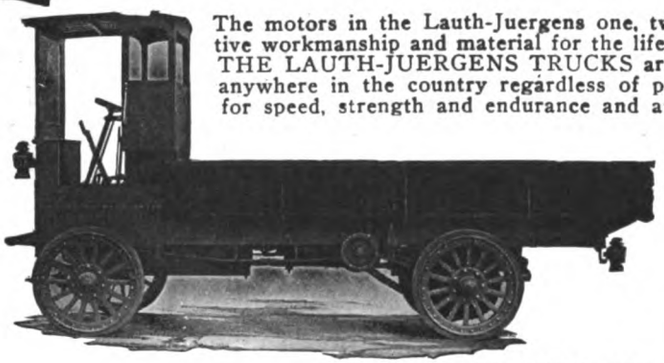
"If you have never driven a Knox up a hill
You have missed half the sport of motoring."

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ONE, TWO AND THREE TON TRUCKS

Guaranteed for Life



The motors in the Lauth-Juergens one, two and three-ton trucks are guaranteed against defective workmanship and material for the life of the truck—CAN YOU ASK MORE? THE LAUTH-JUERGENS TRUCKS are the latest and most powerful built trucks to be had anywhere in the country regardless of price or make. They hold an unquestionable reputation for speed, strength and endurance and are built for years of hard service. They are constructed of the best materials obtainable, bear the finest workmanship the world affords and are manufactured in our own shops—TRANSMISSION, JACK SHAFT, CLUTCH, GEARS AND ALL. That's why Lauth-Juergens trucks are real delivery insurance. Send for complete specifications and our 1912 catalogue telling the story of another great success in motor truck building Reliable agents should communicate with us at once for 1912 territory. Lauth-Juergens Trucks Are Delivery Insurance.

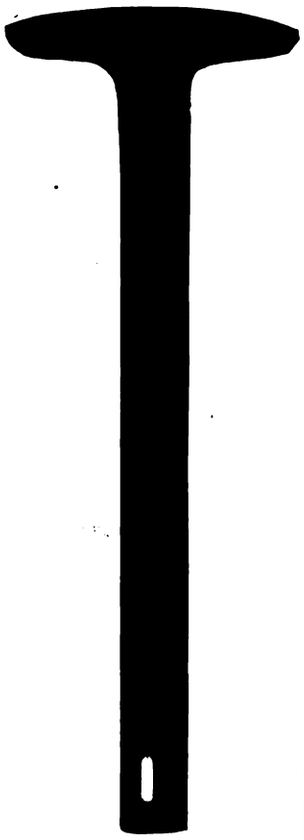
Address: LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

BRANCHES AND AGENCIES

Boston—Lauth-Juergens Motor Co. of New England, 9-11 Harcourt St.
New York—West Side Garage & Motor Co., 160-162 W. 101st St.
Duluth, Minn.—Mutual Auto Co.
Chicago—Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
Newark, N. J.—Merchants Motor Car Co., Essex Building.
Toledo, Ohio—Greasser Motor Co., 100-104 Ottawa St.
Bleil Auto Truck Sales Agency, 453 Dix Ave., Detroit, Agent for Southeastern Michigan.
District of Columbia and Vicinity—Bowles Motor Sales Co., Inc., 1608 14th St., N. W., Washington, D. C.

SPECIFICATIONS OF ONE-TON TRUCK

Motor—Rutenber, four cylinder, water cooled, 4" bore, 4" stroke. Carburetor—Schebler, float feed type. Ignition—Bosch high tension magneto, dual system. Transmission—Selective type, four speeds forward and reverse. Clutch—LJ Patent disc, 3 piece, simple and positive. Brakes—Two internal on rear axle, two external on jack shaft. Drive—Double chain. Axles—Ball bearing; front, 1¾"; rear, 2". Wheels—36" front and rear, Artillery type. Tires—36 x 3" front, 36 x 3½" rear. Frame—Solid angle steel 2 x 3", supported by long truss rods to prevent vibration. Wheel Base—105". Tread—56". Equipment—3 lamps, horn, oil can, full set of tools and jack. Weight—Chassis with driver's seat, 2600 lbs. Price—Chassis with driver's seat, $1950.00 F. O. B. Fremont, Ohio.



THINK THIS OVER

very carefully and read it twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly—tuned up to its highest power. Perhaps the valves pit—warp - go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

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Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

THE ELECTRIC WELDING PRODUCTS COMPANY

CLEVELAND, OHIO

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You Need Speedo

IT'S GUARANTEED

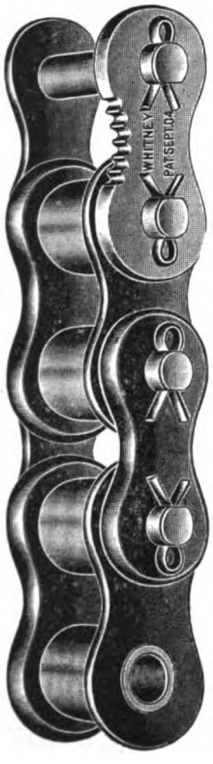
Price
$3.50
With Decarbonizer
High Power Models Upward

It will save **you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.**

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

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WHITNEY

The Most Practical Chain for Motor Trucks

Because the "Whitney" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened or repaired without the use of any special tool. This is of great advantage to truck builders, owners and drivers.

To have your truck equipped with "Whitney" Chains means greater mileage because they are made by specialists in a factory especially equipped for the making and are backed by years of experience. "Whitney" Chains are made from material chosen for quality regardless of cost, and all care taken in their manufacture makes them stand foremost. When making replacements try a "Whitney" and get acquainted with its merits.

"Whitney" Chains Are Built for Strains

The Whitney Manufacturing Co.

HARTFORD, CONN.



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The Reflex



The Eye Can Pierce the Darkest Recesses

of the automobile through the use of the Reflex—a powerful hand electric light with an adjustable mirror.

This unique and most useful little device is meeting with a ready sale not only among car owners, but in garages and repair shops where, during many times in the day it becomes necessary to inspect some hidden part of the automobile—does away with the danger incident to the use of matches or candles in proximity to the gasoline.

The current for the light is furnished by a small but powerful battery, located in the handle, and one charge is sufficient for hundreds of inspections.

Write today and get a full description of the Reflex together with our prices to dealers.

If you sell motor car appliances, you will find this lighting device to be one of your steadiest and best sellers ,after it has once been introduced.

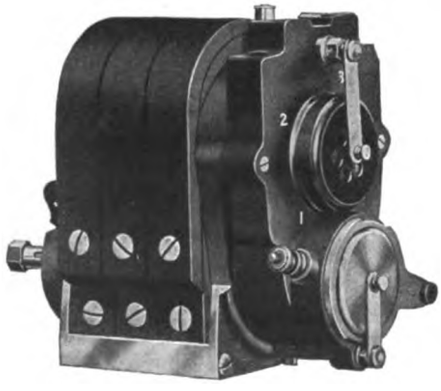


REFLEX INSPECTION LIGHT SALES COMPANY

SOLE SALE RIGHTS FOR UNITED STATES

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$30.00
For this $105.00
6-Cylinder
U. & H. Magneto



Third Annual Magneto Bargain Sale

Imported High Tension Magnetos at Less Than Cost of Importation

Our third annual genuine inventory sale of U. & H. Master Magnetos, made in Germany, is now in progress. All H. P. sizes and types for 1, 2, 4 and 6 cylinder motors, suitable for motor cars, motor wagons, motor boats, motorcycles, stationary engines, etc. Write now, before they are all gone, for circular and price list. The sale is a real Magneto money-saver.

J. S. BRETZ CO., 250 West 54th Street, New York

Let Your Motor Inflate Your Tires

It's not necessary for you to break your back and spoil your temper trying to inflate your tires with an old-fashioned hand pump.



Get a Brown Impulse Tire Pump

and let your motor do the work. It takes but a moment to remove the most convenient spark plug and screw in the Brown Impulse Pump. No tools are necessary.

One to four minutes inflates with pure, cool air to any pressure up to 150 lbs.

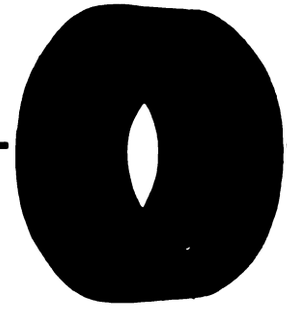
No complicated parts, nothing to wear or get out of order. Will last a life-time.

Enjoy your car this year. The Brown Impulse Tire Pump removes the most disagreeable feature of automobiling. Price, $15.00, including 12 feet of hose, HIGH GRADE RECORDING GAUGE and SELF OPENING VALVE CONNECTION.

An essential part of your 1912 equipment. Ask your dealer or write us for full information.

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Eliminate Noise in Your Car



Use Hyatt Roller Bearings





Hyatt Roller Bearing Co.

Detroit, Michigan

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When you are buying electric headlights—**Look For The Label.**

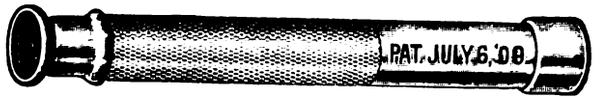
Beauty of design, good materials and workmanship lose most of their value if the right lamp is not in the reflector—**Look For The "FEDERAL" LABEL.**

We have valuable and interesting data for makers of lighting systems and automobile electrical engineers. It's free for the asking.

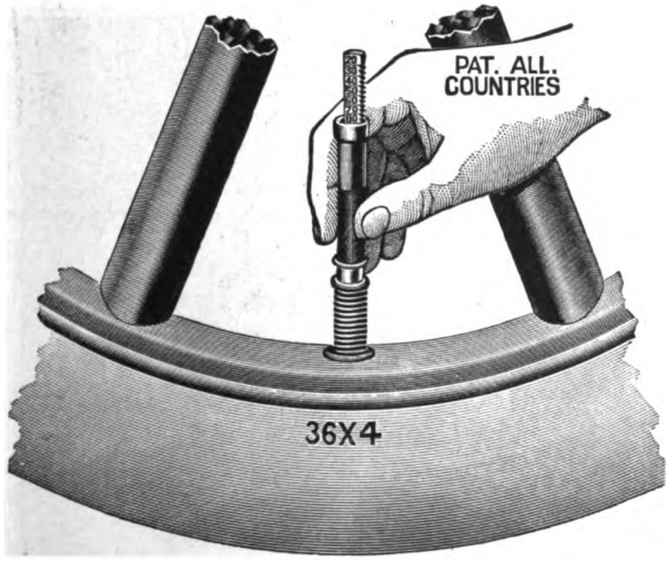
FEDERAL MINIATURE LAMP WORKS
of the General Electric Co.

Main Office, Cleveland, 812 Hippodrome Building **Chicago Branch, 301 Fort Dearborn Building**

Announcement



TWITCHELL AIR GAUGE



The Twitchell Gauge Co. have succeeded the Twitchell-Garvey Mfg. Co. and will in the future market the Twitchell Tire Pressure Gauges.

All patents, rights, etc., including the Twitchell trade name, have been taken over by this firm. Our rights and yours will be vigorously protected under Twitchell patent No. 927,298, which has been repeatedly adjudicated as valid by the courts.

The fine quality of workmanship and accuracy which has distinguished the Twitchell Gauges in the past will be maintained in the future, and this Gauge with the new stop feature, which has been perfected by Mr. Twitchell, is now ready for the market and will thus continue to be the leading Tire Pressure Gauge, as it has been since it first was put on the market.

Mr. Fred G. Bremer has succeeded Mr. James Garvey as manager of this firm.

THE TWITCHELL GAUGE CO.
1256 Michigan Ave. CHICAGO, ILL.

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The Largest Typewriter Sale in History

Ten Thousand Underwood Typewriters



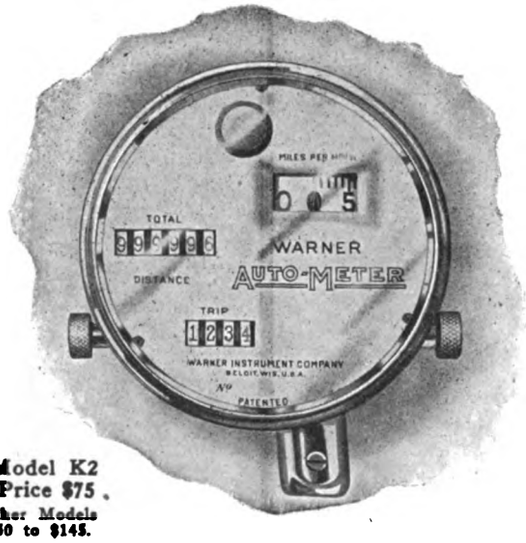
have been sold to the Western Union Telegraph Company for use in all offices throughout its vast organization.

All Telegrams, Night and Day Letters in the future will be typewritten on the Underwood.

Every well known writing machine was carefully considered by the purchasing committee and the Underwood won from the standpoints of practical utility and mechanical construction.

UNDERWOOD TYPEWRITER COMPANY, Incorporated, Underwood Building, New York

"The Machine You Will Eventually Buy"



Model K2
Price $75.
Other Models
$50 to $145.

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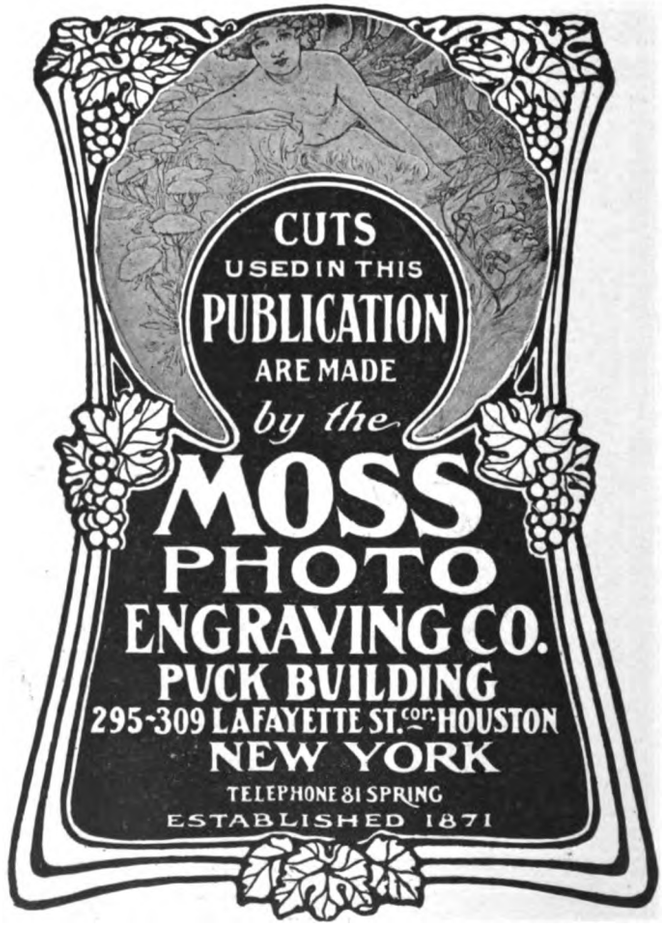
"The Aristocrat of Speed Indicators"

AUTO BUYERS are now insisting on **complete cars.** A good car is not complete without a Warner on it. It is the only speed indicator of even quality with a high grade car.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

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YOU DO

want a smooth-running motor, don't you?

Equip your motor with a set of "AC STAR" spark plugs and you will be able to run at top speed and throttle down with no danger of back-firing, as the superior design of "AC STAR" plugs prevents pre-ignition.

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CHAMPION IGNITION COMPANY
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By Actual Test

(Patented)

The Sparks-Withington One-Piece-Blade RADIATOR FAN will deliver a greater volume of air with less horse-power consumption than any other fan on the market. Bonafide tests furnished to those interested.

With this assurance, and considering that we are specialists in fan construction where you are not, we desire the opportunity only to prove our claims, and, therefore, request your blue prints or a sample fan for estimate. Out of ten standards no doubt we can give you something without making special tools. That would mean a saving to you.

We will gladly test free of charge and submit report on fans you now employ.

Don't fail to write us when you are ready to consider 1912 contract.

THE SPARKS-WITHINGTON CO., Jackson, Mich.

Battery Boxes — Hubs Complete
Ball Bearings — Flanges
Brake Drums — Heavy Stampings



Moline

"King of the Road"

The Aristocrat of American Roadsters

This handsome, roomy, foredoor, straight line car with big artillery wheels and tires, has every desired refinement. In addition it is equipped with the famous

4x6 Long Stroke Motor

unequalled in efficiency, silence of operation and durability. While rated at 35 H. P. this motor will actually develop almost 40. The Roadster shown here is only one of the four New Models of the "Dreadnought" Moline "35." Write for Folder No. 39 showing all styles, specifications and prices.

Dealers will find our latest proposition specially interesting

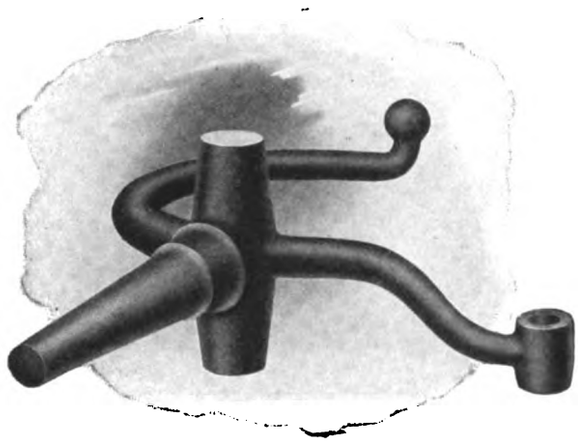
Moline Automobile Company (11)
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Cone Clutches, Too in Addition to Universal Joints

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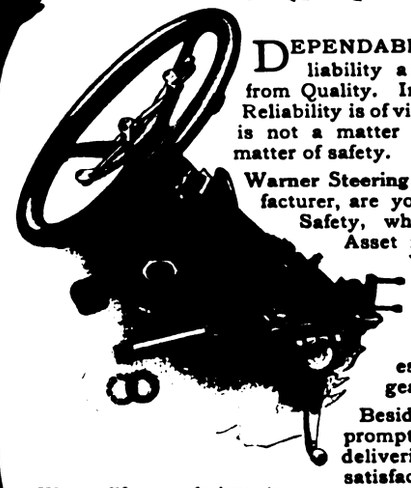
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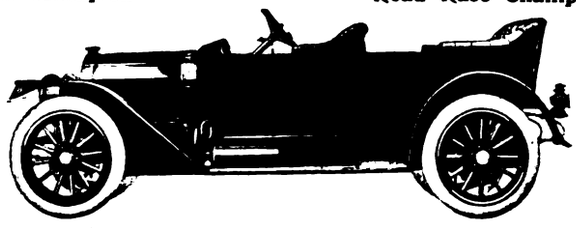
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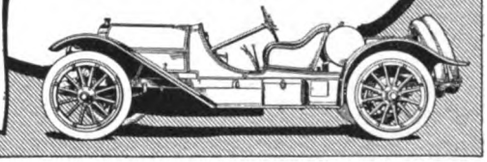
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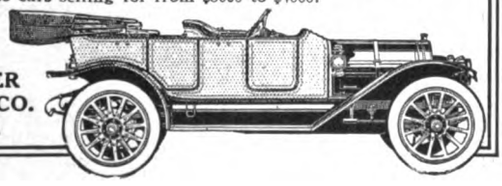


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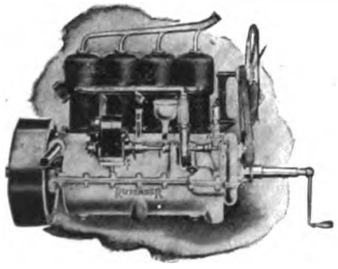
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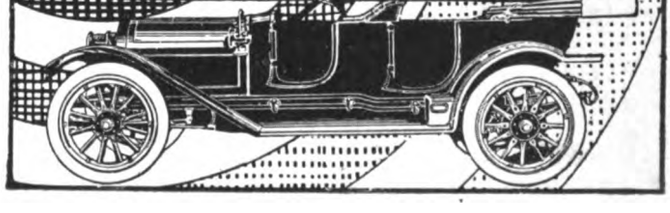
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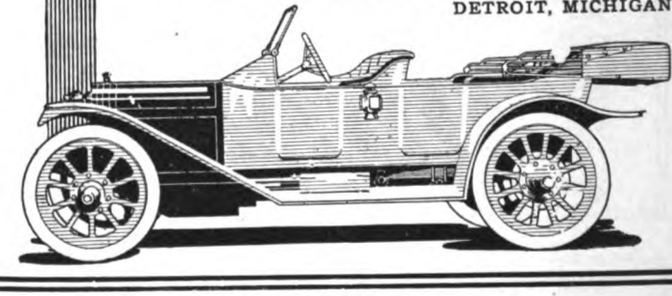
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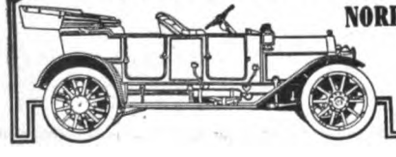


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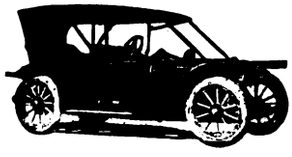
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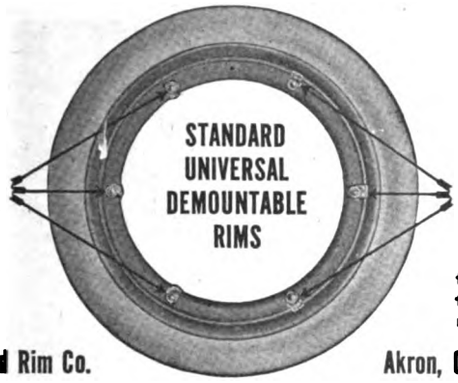
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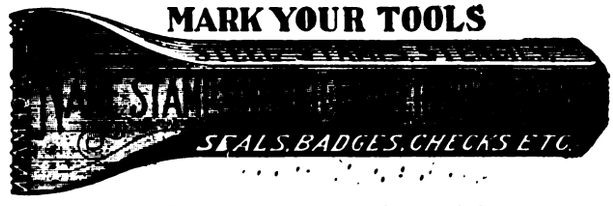
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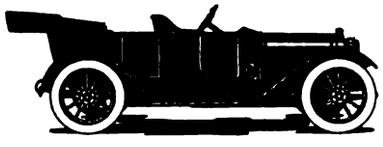
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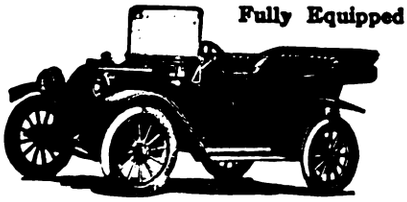
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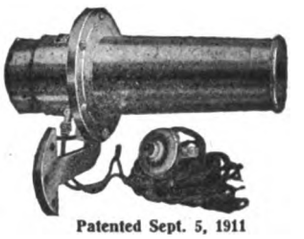
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Established, able dealers are invited to write for information as to open territory. Both pleasure and commercial cars.

W. H. McINTYRE CO., Auburn, Indiana

Champion Spark Plugs

Special Designs for Every Type of Motor Made

CATALOG MAILED ON REQUEST

Champion Spark Plug Co.

TOLEDO, OHIO

The Motor Lamps with Distinctive Features

There are no other motor lamps on the market with the advantages of Solar Lamps. Solars are always exclusive in style and in quality. They are the strongest lamps as well as the most effective.

In no other lamps can you obtain the Solar Special Short Focus Lead Glass Lens Mirror Reflector—the patented system of double ray light projection which gives two distinct fields of light for town and country use—or the new and exclusive black finish with a metallic lustre which is unaffected by heat or moisture. All of these features are exclusively "Solar."

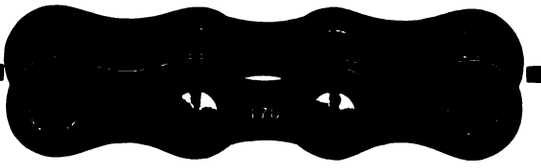
Do not equip your car or specify equipment to the maker until you have seen all of the Solar advantages. See Solars at any live dealer's or write for the catalog.

Solars are made in all styles for oil, electricity, gas and in combinations.

Solar Lamps

BADGER BRASS MANUFACTURING COMPANY

Kenosha, Wis. (137) New York City



DIAMOND CHAINS

are and have been the recognized quality standard for 20 years. Strong, accurate and durable. Let us cut your sprockets.

DIAMOND CHAIN & MFG. CO.

150 W. Georgia St. Indianapolis, Ind.

Capacity 8,000,000 feet per year.

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Buy "Kline Kars First Because Kline Kars Last"

The first American car to adopt the FOUR SPEED FORWARD TRANSMISSION at a price lower than the regular three speed ones acknowledged high grade.

NOTE—All high priced cars have it. WHY? Because it saves fuel, operates easier and makes hill climbing a pleasure on direct drive. INVESTIGATE.

Four and Six Cylinder Models; Prices $1750 to $3500

Self Starter—AGENTS GET OUR PROPOSITION—Address:

KLINE MOTOR CAR CORPORATION, York, Pa.

Factories—York, Pa.; Richmond, Va.

If you are interested in

FEDDERS RADIATORS

we would like to send our latest catalogue.

Fedders Manufacturing Works

57-67 Tonawanda St. BUFFALO, N. Y.

Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.

R. B. ABBOTT SALES CO., Sales Agents, Detroit

"K-B" Universal Joints

FOR

COMMERCIAL CARS PLEASURE CARS

KANT-BEAT

Made from Drop Forgings and Case Hardened Throughout.

ACCURACY, RELIABILITY AND SATISFACTION GUARANTEED

Prompt Deliveries

KINSLER-BENNETT COMPANY, Hartford, Conn.

American Distributing Co., Jackson, Mich., Western Sales Agents

Costs Only $20

"The Crankless" STARTER

The Crankless Self-Starter will start your engine every time.

Just Press the Button With Your Foot

The simplest and most practical self-starter on the market.

COX BRASS MFG. CO., Albany, N. Y.

M & P

1000 Lb. Electric Truck

Standard in Every Detail

Sets a new mark in quality, service, efficiency and economy.

Bare Chassis including Driver's Seat **$1450** Express Body **$1500** Panel Body **$1600**

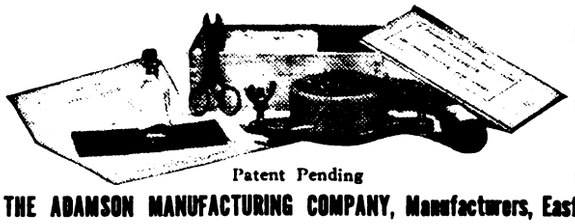
The first electric truck at a popular price. Write or wire for catalog and proposition.

M & P ELECTRIC VEHICLE COMPANY

Franklin and Dubois Sts., Detroit, Mich.

WARNING

PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer

Ever-Ready

Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

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An Announcement

of vital importance to every Manufacturer, Dealer and Car Owner will be made in the near future. Watch for it and read it.

Manufacturers and Dealers Motor Fire Insurance Company
(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

1440 North American Building
Philadelphia

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MAY WE HAVE YOUR LAYOUT

Of Bearing Installation?

¶ We can save you money, time and trouble—in other words, show you a short cut to satisfactory bearing installation.

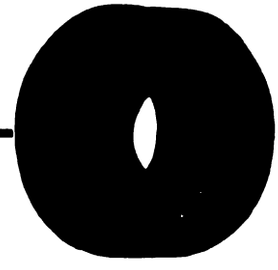
¶ The successful use of New Departures in 60% of the motor cars manufactured in this country proves that the quality of this American made bearing has been well established.

¶ This fact also constitutes a good reason why you should send us your layout and give our engineering and sales departments an opportunity to place our proposition squarely before you.

¶ Our engineering department is highly specialized, not only for the production of superior ball bearings, but for giving to the trade expert co-operative service.

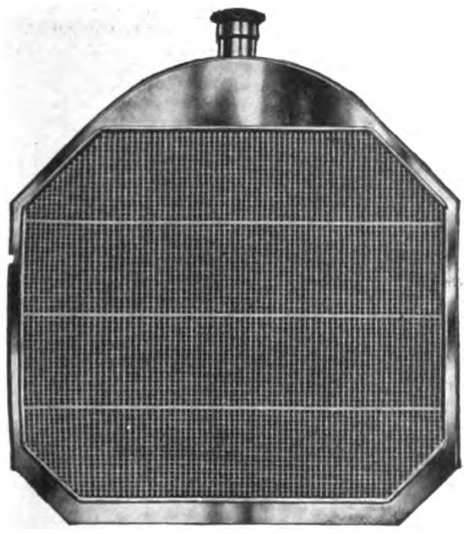
The New Departure Mfg. Company

BRISTOL, CONN.



1016 Ford Bldg. DETROIT, MICH.

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The Mayo—the radiator thoroughbred

¶Every Mayo Radiator goes on the car with a positive guarantee of service—offering a maximum cooling radius and a sturdiness that will successfully withstand hard usage.

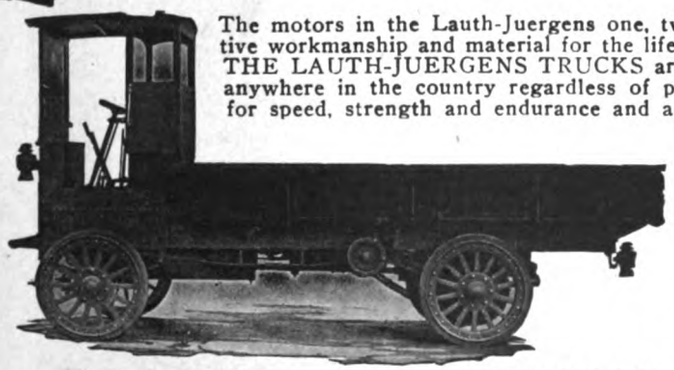
¶Mayo Radiators are standard on many cars of known and tested worth—a big point to consider when the question "which radiator" is of paramount importance.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

Lauth-Juergens

ONE, TWO AND THREE TON TRUCKS

Guaranteed for Life



The motors in the Lauth-Juergens one, two and three-ton trucks are guaranteed against defective workmanship and material for the life of the truck—CAN YOU ASK MORE? THE LAUTH-JUERGENS TRUCKS are the latest and most powerful built trucks to be had anywhere in the country regardless of price or make. They hold an unquestionable reputation for speed, strength and endurance and are built for years of hard service. They are constructed of the best materials obtainable, bear the finest workmanship the world affords and are manufactured in our own shops—TRANSMISSION, JACK SHAFT, CLUTCH, GEARS AND ALL. That's why Lauth-Juergens trucks are real delivery insurance. Send for complete specifications and our 1912 catalogue telling the story of another great success in motor truck building. Reliable agents should communicate with us at once for 1912 territory.

Lauth-Juergens Trucks Are Delivery Insurance.

Address: LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

BRANCHES AND AGENCIES

Boston—Lauth-Juergens Motor Co. of New England, 9-11 Harcourt St.
New York—West Side Garage & Motor Co., 160-162 W. 101st St.
Duluth, Minn.—Mutual Auto Co.
Chicago—Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
Newark, N. J.—Merchants Motor Car Co., Essex Building.
Toledo, Ohio—Greasser Motor Co., 100-104 Ottawa St.
Bleil Auto Truck Sales Agency, 453 Dix Ave., Detroit, Agent for Southeastern Michigan.
District of Columbia and Vicinity—Bowles Motor Sales Co., Inc., 1608 14th St., N. W., Washington, D. C.

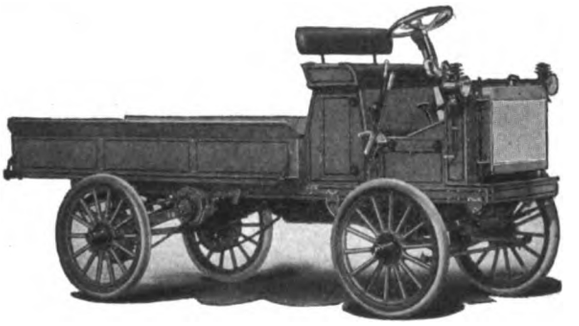
SPECIFICATIONS OF ONE-TON TRUCK

Motor—Rutenber, four cylinder, water cooled, 4" bore, 4" stroke. Carburetor—Schebler, float feed type. Ignition—Bosch high tension magneto, dual system. Transmission—Selective type, four speeds forward and reverse. Clutch—LJ Patent disc, 3 piece, simple and positive. Brakes—Two internal on rear axle, two external on jack shaft. Drive—Double chain. Axles—Ball bearing; front, 1¼"; rear, 2". Wheels—36" front and rear, Artillery type. Tires—36 x 3" front, 36 x 3½" rear. Frame—Solid angle steel 2 x 3", supported by long truss rods to prevent vibration. Wheel Base—105". Tread—56". Equipment—3 lamps, horn, oil can, full set of tools and jack. Weight—Chassis with driver's seat, 2600 lbs. Price—Chassis with driver's seat, $1950.00 F. O. B. Fremont, Ohio.

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Sanford

Chassis
$1600



Stake or Express Body
$1750

The more rigid the test—the closer the investigation—the higher this standardized truck stands in the buyer's mind.

Sanford trucks are built to harmonize delivery departments of successful firms with the other departments. Sanford trucks installed assure delivery at the right cost.

Sanford trucks represent nine years designing and building. They are the finished product of all those years of thought and labor by the present engineering staff of the Sanford Motor Truck Co.

No truck can offer a greater factor of safety all through its construction than a Sanford. No truck could be better built. No truck is so thoroughly standardized as is the Sanford.

No manufacturer has ever offered to dealers so remarkable a proposition as we offer.

Ample motor capacity (4 cylinders, water cooled, 4 x 4½), unit power plant type, three point suspension, with clutch and fly wheel enclosed in oil tight aluminum housing.

The service brakes are on the rear wheel brake drums and operate positively and equally on a braking surface of 245 square inches—braking backward as well as forward. The emergency brakes operate on the jack shaft drums.

Positive and never failing lubrication. A combination of splash and force feed. The Sanford system provides oil by force directly upon all bearings inside the clutch.

As to accessibility—well, we sometimes think that our truck was designed around this absolute essential. No truck could be more accessible than the Sanford in any one specific part or in any one specific assembly or in an entire assembly.

We have the truck and the proposition. All we need now is you. YOU need us. You'll say so yourself if you'll write us immediately. Don't wait. Write today for we're after your territory with both feet.

The Sanford Motor Truck Company

SYRACUSE, NEW YORK

Makers Always and Exclusively of One Ton Trucks

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

A Common Sense Signal.

THAT the TUTO horn has added greatly to the ease and safety in touring, is best shown by the many words of commendation which have been voluntarily given. Thousands of these horns were used throughout the past year in touring in this and foreign countries, proving conclusively that the notes of the TUTO horn are sufficiently distinctive to clear the way and assist in avoiding the many accidents incident to such travel.

¶ The extreme ease with which the TUTO horn is operated through the placing of a push button on the steering wheel and right under the thumb, is in strong contrast to the usually laborous and ineffectual working of the old antiquated bulb horn.

¶ Then the providing of two distinct and separate tones in the one TUTO mechanism, has made it possible for tourists to sound a low abrupt signal, which is acknowledged to clear the way fully 90 per cent. of the time, without causing undue disturbance and the incurring of the displeasure of local police authorities in the various cities.

¶ The loud note of the TUTO horn, being instantly available by a complete pressure on the same button as used in producing the low tone, assures the utmost safety.

¶ The fact that it is not necessary to always blow the loud signal or to juggle with a button in the attempt to get a low note from the one-tone loud electric horn, adds greatly to the pleasure of touring

¶ The occupants of the car are not continually being unnerved by the racking and useless noise of a warning signal which is inadequate, due to the fact that it has only one loud note for use on all occasions.

¶ The TUTO makes motoring easy, adds to the comfort and safety and thus is the only logical signal to use for standard equipment on the modern motor car.

The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen."

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The "Crankless" STARTER

With this new improvement the Crankless admits no equal.

By adding an injector and set of cylinder connections to the original crankless manifold connection, we now offer unquestionably the last word in self starters.

Now we guarantee to start your motor every time—guarantee it with the standing and reputation of our forty years in business.

Just press the button with your foot—nine times out of ten your motor will start. That other time, force gas and air into your cylinders—and away you go.

The pump is like the spare tire—when you don't need it—don't use it. But when that "once-in-a-while-that-you-do-need-it" comes, it's fine business to have the injector handy.

There's absolutely nothing on the market that can compare for one second with this improved Crankless.

It's the simplest—the safest—the surest starter ever devised.

And the price is right—and our guarantee is good.

ALBANY, N. Y.,
Pearl and Van Woert Sts.
NEW YORK CITY,
1777 Broadway
BOSTON, MASS.,
899 Boylston Street
DETROIT, MICH.,
870 Woodward Avenue

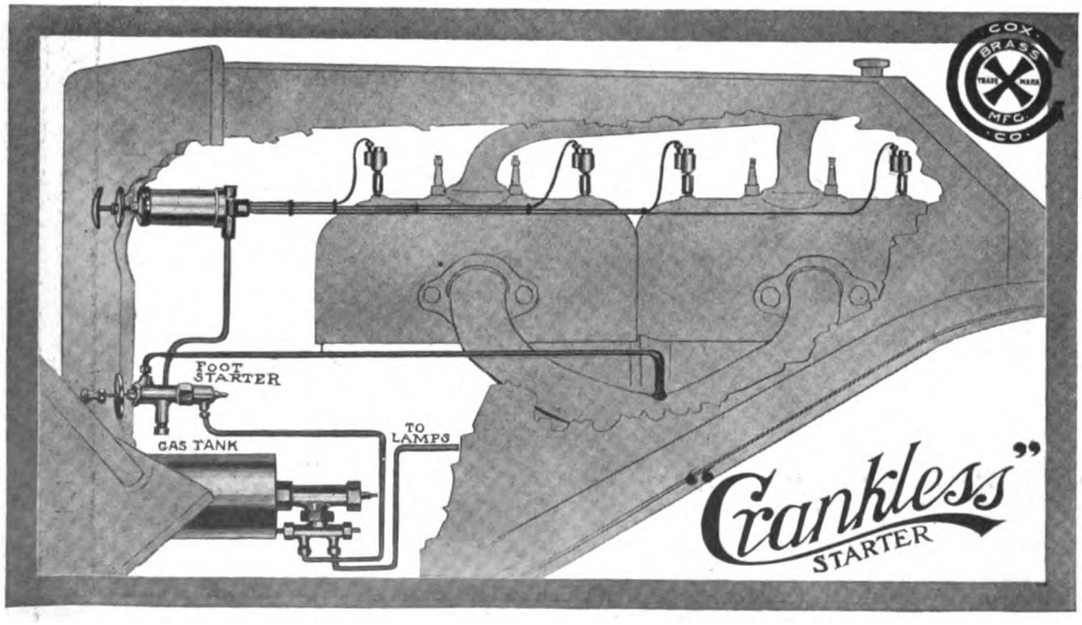
COX BRASS MANUFACTURING CO.
(Established 1872)
Albany, New York

Wise Dealers won't delay writing.

$20

Without Cylinder Attachments

Extra for Cylinder Attachments
4 Cylinder $10.00
6 Cylinder $15.00



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The Story of the Tell-Tale Dial

Upon the wall of the factory chief's room is a little instrument on whose dial a story is written each day.

A tale white-hot with interest to the man with the key to its meaning. It's a story of faithfulness in the heat-treating of



The instrument with the tell-tale dial is a recording pyrometer.

It is connected each day and each night with one of the heat-treating furnaces—which furnace only the chief himself knows.

Wires lead from the electric resistance thermometer in that furnace to the pyrometer on the chief's wall.

Clockwork and the current operate a pen which records in clear-cut lines the temperature for every minute and hour of the time.

A Check on Other Records

Out in the furnace room is another pyrometer. That one is for the man who reads the temperature of all the furnaces each quarter of an hour.

He is the man whose signals of red, white or green light at each oven tell the furnace man how to regulate his fire and when to remove the glowing steel.

Now, who is to prove that the work is done right? Who knows that no one has cooled the furnace by opening its door in the night?

Answer—The tell-tale dial.

Timken Heat-Treatment is an Exact Science

Each piece in the Timken-Detroit Axle has its particular heat-treatment.

The one treatment which will bring out the best that is in the kind of steel used for the particular work each piece must perform.

Long experience and careful records of results have determined the exact degree of heat and exact length of time for each part. *And the dial tells that the work is done right.*

The story of the dial is one of the interesting stories in Timken-Detroit manufacture.

It is this back-of-the-scenes integrity of manufacture—this extreme care in every process—that produces axles which stand up to the gruelling test of service day after day and year after year over all kinds of roads.

The Timken-Detroit Axle Company

Detroit, Michigan, U. S. A.

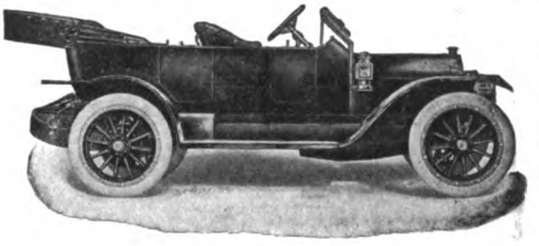
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The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings

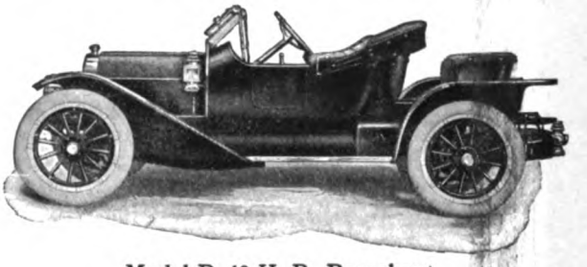
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KNOX

PLEASURE VEHICLES
Offer the Utmost in Automobile Value



Model R, 40 H. P., 5-Passenger Torpedo



Model R, 40 H. P., Raceabout

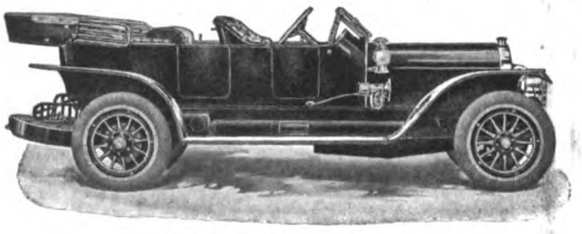
A high grade line of cars built for lasting service with the most luxurious appointments and thorough equipment.

Knox cars are a manufactured and not an assembled product. They are built in accordance with the highest manufacturing standards by a Company that never believes a sale is completed until each car has given its full measure of satisfaction.

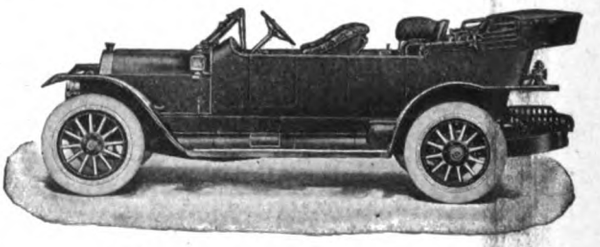
Our illustrated booklet "Knox Motor Cars" mailed on request.

KNOX AUTOMOBILE COMPANY, Springfield, Mass.

Branches—New York; Chicago



Model S, 60 H. P., Torpedo



Model R-45, 40 H. P., Touring Car

"If you have never driven a Knox up a hill you have missed half the sport of motoring."

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Which Tire?



No-Rim-Cut Tire
10% Oversize

Here is the Goodyear No-Rim-Cut tire—the hookless tire—the oversize tire.

The tire that cuts tire bills in two.

More than one million have been tested out. As a result, this tire outsells any other tire in existence.



The Passing Type
No Oversize

This is the old type—the hooked-base tire—which No-Rim-Cut tires are displacing.

23 per cent of these tires become rim-cut.

Yet these tires—wasteful and worrisome, and of lesser capacity—cost the same as Goodyear No-Rim-Cut tires.

Hookless Tires

Note that these tires have no hooks on the base. They do not, like old types, need to hook into the rim flanges.

So your removable rim flanges are slipped to the opposite sides. Then they curve outward, not inward.

This tire, when wholly or partly deflated, rests on a rounded edge, and rim-cutting is made impossible.

126 Braided Wires

In the base of this tire run six flat bands of 126 braided wires.

They are vulcanized in to make the tire base unstretchable.

The tire can't come off because the base can't give. Nothing can force it over the rim flange. So hooks or tire bolts are not needed.

But, when you unlock and remove one of the flanges, the tire slips off like any quick-detachable.

It slips off much easier, because there are no hooks to "freeze" into the rim flanges.

10% Oversize

To take care of your extras—to give you an overtired car—we make these tires 10 per cent. over the rated size. And without extra charge.

That means 10 per cent. more air—10 per cent. added carrying capacity. That saves the blow-outs due to overloading. This 10 per cent. oversize, under average conditions, adds 25 per cent. to the tire mileage.

We Control It

This braided wire feature, which makes this type possible, is controlled by the Goodyear patents.

Single wires have been used—twisted wires have been used—to get this unstretchable tire base. But results are unsatisfactory.

These bands of braided wires, which need no welding—which cannot break or loosen—form the only way known to make satisfactory tires of this type.

No-Rim-Cut tires are satisfactory. Be careful to get them when you change to this type.

On Same Rims

This old type tire—this clincher tire—is on the same rim as the No-Rim-Cut tire.

All standard rims take either type.

But the removable rim flanges are here set to curve inward—to grasp the hooks in the tire base and hold the tire on.

When this tire is wholly or partly deflated the thin edge of the flange digs into it. That is the cause of rim-cutting.

GOODYEAR
No-Rim-Cut Tires
With or Without Non-Skid Treads

If this tire is punctured or run soft, it may be wrecked very quickly, and beyond repair.

Doubled Cost

This type of tire, under average conditions, means to double one's tire cost over our new type.

It comes in this way:

Statistics show that 23 per cent. of all ruined clincher tires are rim cut.

And the smaller capacity, with the average car, cuts tire mileage 25 per cent.

These are net losses, because No-Rim-Cut tires now cost no more than other standard tires.

The 13-Year Tire

Goodyear tires as made today are the final result of 13 years spent in tire making.

We have compared in that time some 240 formulas and fabrics. We have compared every method of wrapping and vulcanizing.

They have been compared on tire testing machines, where four tires at a time are constantly worn out under all sorts of road conditions.

Thus we compare all rival tires with our own.

The result is a tire which comes close to finality.

When this tire is made oversize—made so it can't rim-cut—it means the utmost in pneumatic tires.

Some 200,000 tire buyers have proved this. No-Rim-Cut tires have thus become the most popular tires in existence.

Our 1912 Tire Book, based on all our experience, is filled with facts you should know. Ask us to mail it to you.

THE GOODYEAR TIRE & RUBBER COMPANY, Arthur Street, Akron, Ohio

Branches and Agencies in 103 Principal Cities **We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits**

Main Canadian office, Toronto, Ont. **Canadian Factory, Bowmanville, Ont.** (566)

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Toadstools and Mushrooms Look Alike

But you can tell the difference the minute they get into action.

The difference between *speedometers* is chiefly *under the skin.* Some devices carried on automobiles may *look* like *Stewart Speedometers,* but *users* find out the difference. The *Stewart* doesn't travel on its *looks* alone, but it travels on *four* cars out of *five* — and makes *good* on all of them.

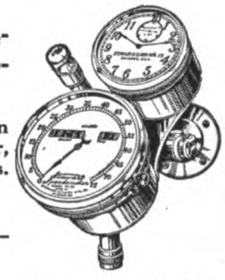
It's the most *accurate* — the most *sturdy* — the most *reliable* speedometer made.

By *every* test it's far the *best.*

We manufacture on such a huge scale — our output is so tremendous — that the *Stewart* can be retailed for *less* than the production cost of the *rest.*

Magnetic principle — jewel bearings — wearing parts hardened and polished; open dial — big figures, easily read — absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft — drop forged swivel joint — noiseless gears.

"ALWAYS ON THE JOB"



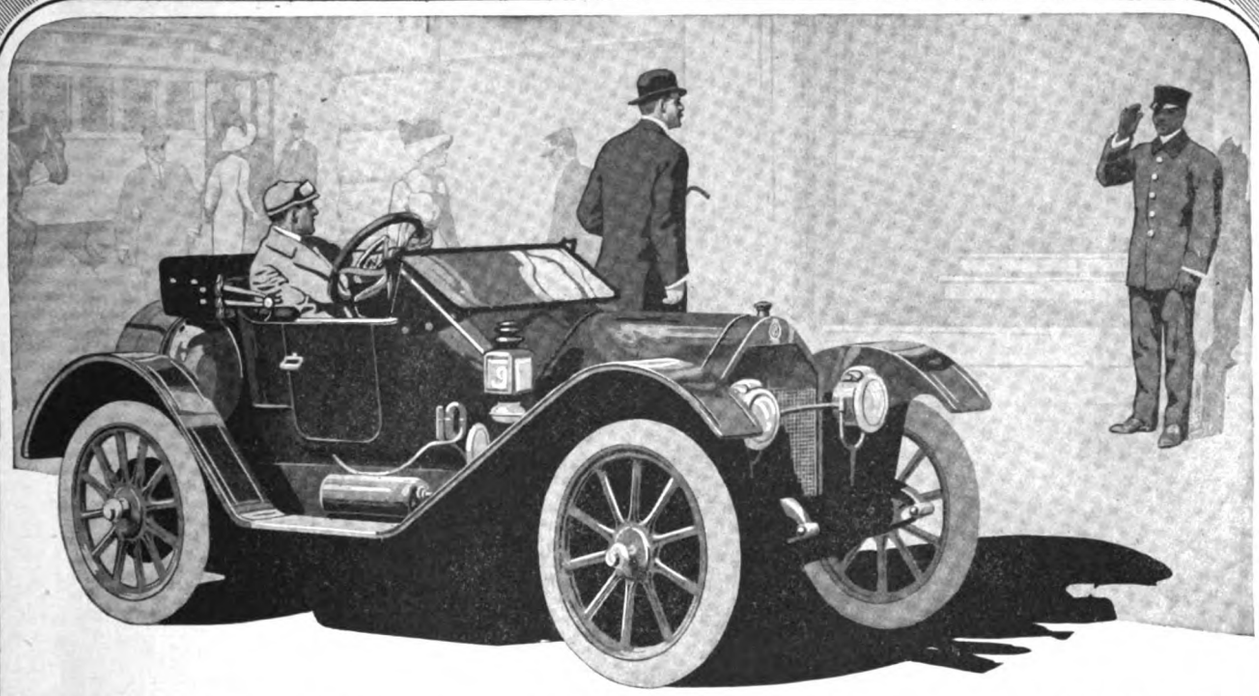
Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

Stewart & Clark Manufacturing Company

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston Kansas City Cleveland Philadelphia Minneapolis Indianapolis London Paris

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New Chalmers "30" Roadster—$1400

A stylish, snappy, two-passenger torpedo roadster, with Chalmers self-starter, handsome top, windshield, tire-irons, quick-detachable 34 x 3 1-2 in. tires, cellular radiator, nickel trimmings, body finished in blue, hood and chassis black.

THE CHALMERS "30" Torpedo Roadster is designed for those who want a graceful, speedy, comfortable two-passenger car at a low price. It has all the features any one could desire in a car of this type.

This car has the Chalmers Self-starter—efficient, reliable, and simple. No cranking. No bother. No danger.

The seat is generously wide for two persons and is enclosed with wide torpedo doors. Gear shift and brake levers are inside the body. The body is low hung to give greatest riding ease.

The close-fitting top is of brown duck, making a very pleasant combination with the colors of the rest of the car. Side curtains and storm front go with the top.

Lamps, door handles, and metal parts of wind shield are black enameled with nickel trimmings. Other bright metal parts of car, such as steering column, bonnet hinges, running board ledge, are nickel-plated.

The roadster has beauty of line—perfect symmetry. It is handsomely finished, the body is painted an attractive blue with black mouldings. Hood and chassis, including wheels, are black with blue striping.

The gasoline tank is large enough so that it will only require refilling about once a week in ordinary driving. It holds 35 gallons, and is enameled black to harmonize with the chassis.

A Car for Men Who Do Things

There are no limits to the practical uses of the Chalmers "30" Torpedo Roadster. This car meets every demand of the man to whom being in the right place at the right time means everything.

The physician, the contractor, the real estate man, the salesman, the manufacturer—in fact, any one to whom time is money—will find this car a willing, efficient assistant.

The man who lives out of town, or whose business takes him to near-by towns frequently, finds a Chalmers roadster most convenient. He is independent of train schedules.

Think how much more you could accomplish in a day with less effort than you now spend if you owned one of these cars. It takes less than one-third as long to get around in an automobile as in a street car.

If you already have a touring car you can multiply by two the efficiency of your motor-car service by using the Chalmers roadster.

Buy a Car That Will Last

The Chalmers Roadster is a real car—not a toy. It is solidly built—the kind of car to stand up under hard usage and bad weather. It has the looks and finish of a high-priced car.

It has the same mechanical features which have demonstrated their efficiency in other models of the famous Chalmers "30."

The price of $1400 includes complete equipment—Chalmers self-starter, magneto, dual ignition, Prest-O-Lite tank, gas lamps and oil lamps, top and automatic wind shield, tire irons, horn, tire inflater, pump, jack, full set of tools, and tire repair outfit.

Call and see this Torpedo Roadster at our dealer's. There you can see for yourself how good it is.

Orders for this car should be placed at once to insure delivery this season. Only a limited number of "30" roadsters are being built, and the demand is sure to exceed this number.

Chalmers Motor Company, Detroit, Mich.

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Performance the Mighty Factor Behind the Success of Fisk Tires Heavy Car Type

THEIR rapidly increasing sale is due to the verdict of the car owners who, once using them, buy again for their own cars and recommend them to their friends. "You are urged to inquire among Fisk Tire users" because we can present no stronger argument than the everyday service Fisk Equipment is giving. MILEAGE AND DIRECT REPRESENTATION combine to make the only service that really interests any buyer. It is *that* SERVICE upon which the success of Fisk Tires is founded.

Two New Anti-Skid Tires

Bailey Tread

Heavy buttons and one more row than any other Bailey Tread on the market. This increases the anti-skid surface and length of service as outside rows of buttons give anti-skid protection when center tread is worn down. These buttons are additional to the regular thickness of the smooth tread tire.



Town Car Tread

This provides a heavy anti-skid tread designed to insure traction and afford the greatest possible protection against skidding. It is positive in action on city pavements and country roads, and eliminates the necessity of chains with the attendant expense, noise and inconvenience.

Fisk Heavy Car Type Tires Are Sold by All Prominent Dealers

THE FISK RUBBER COMPANY

Department 23 **Direct Factory Branches in 35 Cities** **Chicopee Falls, Mass.**

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ELEVEN FACTS ABOUT HYATT ROLLER BEARINGS

1st



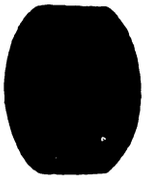
Hyatt Roller Bearings afford a line (—) bearing instead of a point (.) bearing as is the case with ball bearings. There is more surface to carry the load, yet with but little friction. They are American bearings for American roads.

2nd



Hyatt Roller Bearings are flexible. They give under shock, still are rigid enough to carry their load and remain round.

3rd



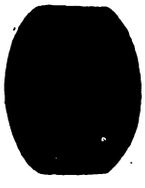
Hyatt Roller Bearings are Quiet. Noise is caused by the vibratory motion of any solid substance. Shocks and jars produce vibrations which rigid bearings transmit and intensify. The flexibility of the Hyatt Roller cushions shocks—absorbs vibrations—hence reduces noise.

4th



Hyatt Roller Bearings will retain a large quantity of Lubricant because the rollers are hollow. The spirals in the rollers alternate from right to left, thus constantly distributing the lubricant in all directions over the surface of the rollers.

5th



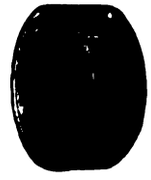
Hyatt Roller Bearings have No delicate Adjustments to be tampered with after the car has left the factory. Carelessness, curiosity or ignorance will not cause trouble by making improper adjustments in Hyatt Bearings as is often the case with others.

6th



Hyatt Roller Bearings are less liable to Accident or Injury because they carry the same load on a larger surface than ball bearings afford.

7th



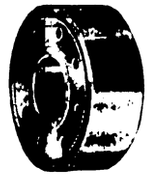
Hyatt Rollers Never Crowd or pile up in a bearing, thereby grinding and destroying the entire bearing.

8th



Hyatt Rollers Will Not Crack or split as balls sometimes do when the wheels drop into a rut and the car is heavily loaded, thus causing annoyance, delays and expensive repairs.

9th



Hyatt Roller Bearings Reduce excessive and unnecessary Wear because they relieve gears and shafts of undue strains resulting from imperfect alignment.

10th



Hyatt Roller Bearings are made only from carefully Selected Steels which are chemically and physically tested, hardened and ground.

11th

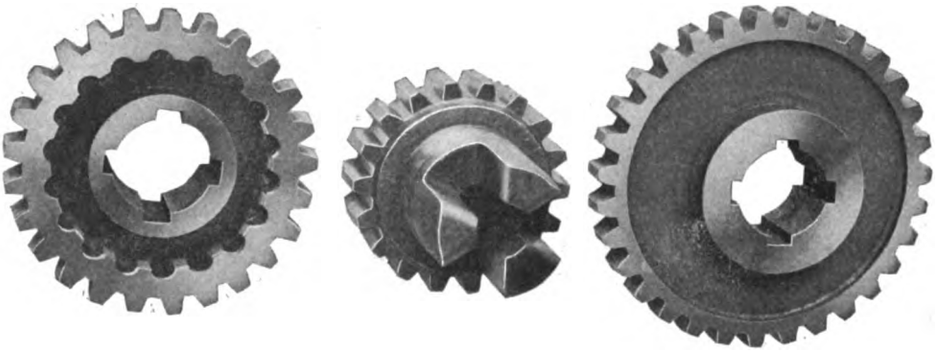


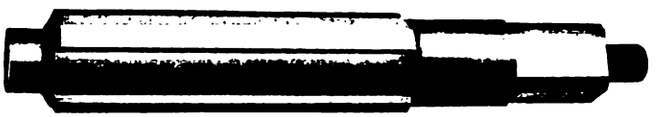
Hyatt Roller Bearings will be used on 91.7% of all pleasure and commercial cars that will be manufactured during the season of 1912.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

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Grant-Lees





Gears

Four Reasons Why

Because—

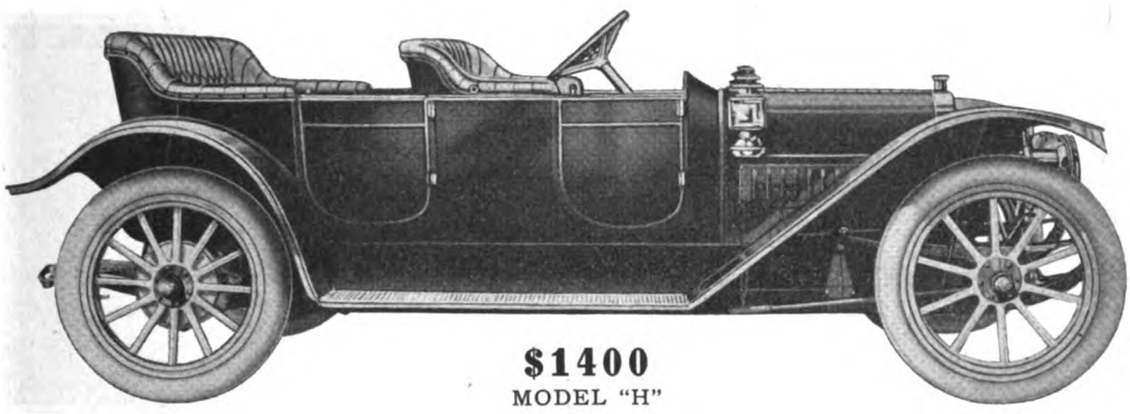
(a) They are the most accurately machined.
(b) They contain the best materials which have been proven best by actual working tests.
(c) They are scientifically heat-treated.
(d) They arrive when promised.

Pioneers of the Helical Gear in the United States.
Differentials, Worm-Gears and also Worms.

GRANT-LEES MACHINE COMPANY
Cleveland, Ohio

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The Comprehensive Regal Line



$1400
MODEL "H"

The Regal "35" Underslung Touring Car

A COMPREHENSIVE LINE is the natural business getting Line for any dealer to handle. By comprehensive, we mean a line of automobiles that are distinctive in design—advanced in construction, high in quality in comparison—and lowest in price by all fixed standards as automobile values are classified today. We affirm the Regal line of cars to be nearer this dealer's ideal proposition than any line we happen to know of.

IT IS GOOD BUSINESS POLICY for the dealer to be able to meet any or all demands that may be made for certain types and certain prices by prospective purchasers of automobiles. Just because you happen to represent a car that doesn't meet the necessities of a man's pocket-book or his pre-conceived conception of about the kind of car he wants, it hurts to see him go up or down the street and buy elsewhere—besides, it's a poor business organization that can't meet competition.

THERE ARE A LOT OF MEN in your town or community who have set their hearts upon a Roadster. They don't want to pay a fancy price. They want a Roadster that is built a Roadster from the ground up. No Roadster body on a touring car Chassis for them. They desire a car that not only is a Roadster, looks like a Roadster, with power and speed enough to act like a Roadster, but is also a reasonable price. It is just because the Regal "25" Underslung Roadster at $900 is the most beautiful, most advanced in Roadster construction and the lowest-priced Roadster, quality considered, upon the market, that we sold more Roadsters last year than any other maker in the business—We should say, Regal dealers sold them.

YOU ALSO KNOW of a number of people who have decided that they can afford a Touring Car (if it meets their ideas of a good car) around $1000. Lucky the dealer who sells such a car because he has before him a certainty of big business for 1912. But a "25" horse-powered "Underslung" Touring Car at $950 with 106 inch wheel base and all the Chassis and body equipment of cars selling at double the price, is a business asset that even in this day of stiff competition is worth talking about. Our competitors frankly acknowledged at the New York and Chicago shows that this new Regal hadn't any competition. The answer for any dealer is "I can sell more of these Regal Cars in 1912 than I have ever sold of any make of cars since I have been in business."

AMONG YOUR PROSPECTS are also a number of doctors and business men to whom you can sell Coupes. This is a type of car that has become exceedingly popular, because it meets weather inclemency and gives a lot of all year 'round comfort. You've seen the Regal "25" Underslung Colonial Coupe at $1250. You couldn't help it because it is the most distinctively beautiful Coupe in the country and we're not bragging either. You've secretly admired it and tried to compare it with other Coupes. But you can't find a true comparison for this car. Ever since it made its appearance our dealers have kept us busy filling orders. It's a car that sells itself. No man who was in the market for a Coupe and saw this Regal Underslung ever went any further to see another. Besides, for $150 extra he could buy a Roadster body and he had a car for any season. Surely, there is a moral here for any dealer.

THEN, ALONG COMES THE MAN who wants a car around $1400. There's a Regal Underslung for him, too. We call it Model "H," our "35" H. P. Touring Car. The climax of the Regal Comprehensive Line. A big, powerful, roomy, beautiful car that embodies the elements of safety, economy, accessibility, comfort and easy riding ability peculiar to the advanced "Underslung" construction. This was the first "Underslung" Touring Car built to sell for less than $4,000. The car that gave an opportunity for men of moderate incomes to enjoy the advantages of this costly construction. Here are a few of its generous specifications: Motor, 35 H. P. 4 cylinders (in pairs) 4¼ x 4½; Wheel base, 118 inches; Morgan & Wright tires 34 x 4; Demountable rims (one extra free of charge); three speeds and reverse. Hyatt nickel steel roller bearings. Dual ignition with magneto. Standard equipment, etc.

WE'VE PRESENTED OUR CASE—Here are cars that meet the demand of the majority of people who buy automobiles. They also have these advantages. They are all "Underslungs." Any engineer will tell you Underslung construction is the eventual construction. They present a range of Models to suit every taste and need. What is most important—any one of these cars presents more in quality at a less cost to the purchaser than any car we know of. For instance, where can a man buy a "25" H. P. Underslung Touring Car for $950? The Regal Line is a big business asset for any dealer.

REGAL MOTOR CAR COMPANY, Automobile Manufacturers Detroit, Michigan

SOME REGAL WAREHOUSES:

BOSTON—50 Washington St., Brookline
BUFFALO—249 Delaware Ave.
CHICAGO—1502 Michigan Ave.
DALLAS—304-6 N. Akard St.
KANSAS CITY—Franklin-Hudson Ptg. Bldg., 22d and Oak Sts.
MINNEAPOLIS—1400 Hennepin Ave.
NEW YORK—136-46 W. 52d St., Randall Bldg.
OMAHA—2209 Farnum St.
SAN FRANCISCO—720 Harrison St.

FOREIGN DEPARTMENT—18 Broadway, New York

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A Straight side or Clincher Tire fits the same STANDARD UNIVERSAL RIM





THE REMOVABLE RIM flanges are simply reversed—they curve outward on one side to fit a straight side tire, inward on the other to accommodate a clincher.

The Automobile Manufacturer should equip his cars with STANDARD UNIVERSAL RIMS. He removes another obstacle from the highway of increased sales. The automobile enthusiast demanding any style of tires can be satisfied by merely the change of casings.

The Tire Maker should welcome STANDARD UNIVERSAL RIMS, knowing that any style of tire, whether straight side or clincher, will fit this universal rim. He sells the style that he desires to push.

The Auto Buyer should demand STANDARD UNIVERSAL RIMS. He has an unlimited tire field from which to make his selections—any type—any style.



STANDARD UNIVERSAL QUICK DETACHABLE DEMOUNTABLE RIMS—Two turns locks in place and two turns unlocks for demounting. Send for Catalogue No. 607.

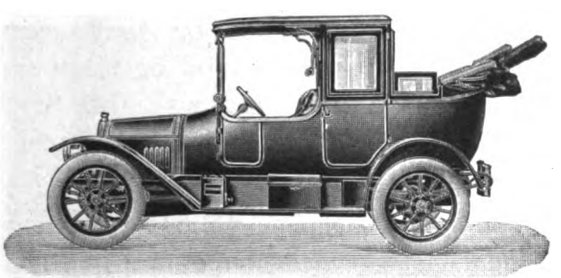
THE UNITED RIM COMPANY

Akron, Ohio

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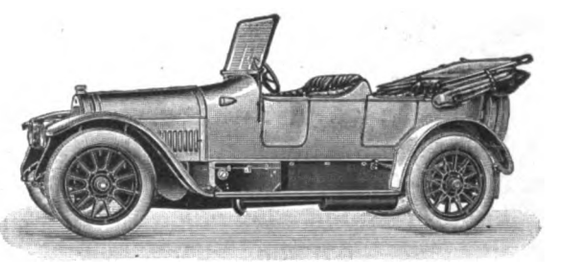
BENZ

The BENZ cars embody the best material and the finest workmanship in the world. They are constructed by the pioneer firm of the motor industry, to render long and efficient service.



Benz Carroseries are noted for their rakish lines, superb upholstery and luxury of equipment.

The special steel and unique construction renders our car the lightest and most powerful car in the world.



We Are Now Ready to Receive Propositions for Agencies.

Catalogues cheerfully furnished on application

BENZ AUTO IMPORT CO. OF AMERICA

Direct Branch of and Owned and Controlled by Benz & Cie., Mannheim, Germany, the Original Makers of Automobiles. First Car Produced in 1883.

SALES ROOMS: 244-250 W. 54th St., near Broadway, New York, U.S.A.

Telephone 5947 Columbus

SERVICE BUILDING: 13th to 14th Streets and Boulevard, Long Island City, New York, U.S.A.

Telephone 4066 Hunter's Point

Benz-Gaggenan Trucks the Best in the World

Write for Catalog and Agency Proposition

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Self Hanna Starter

Back of every Starter we sell is an unlimited guarantee.

The fact that we charge only $10.00 for the Valentine Self-starter and Gas Lighter does not mean that it is a cheap starter—it means only that $10.00 is enough for a man to pay for a manifold starter.

The first acetylene starter on the market. The only 100 per cent. efficient self starter.

Hanna Self-starter, such a thing as failing to start is unknown. Nor will the Hanna Self-starter soot or foul your plugs in any way, shape or manner. The Hanna Self-starter was the first acetylene self-starter on the market—but it was never pushed until it had reached its present perfected state—that is how the Hanna Self-starter is able unqualifiedly to guarantee its operation and construction. And its guarantee is not limited in any way.

We guarantee the Valentine Self-starter to do just what we claim for it and when we sell it, we stand ready to refund the money if the purchaser is not thoroughly satisfied with it. All of our dealers are authorized to make this same proposition and we stand back of them.

Of course, we guarantee the Hanna Self-starter to be absolutely 100 per cent. efficient—with the

No manifold starter at any price is better than this at

$10

By becoming our representatives, dealers are taking on the best line for themselves. If your customer wants a low priced manifold starter, sell him the Valentine for $10.00; if he wants the superior of all other starters, the only 100 per cent efficient self-starter, sell him the Hanna Self-starter at $35.00. If he buys the Valentine and later wants the Hanna, allow him full price for the Valentine.

Carry this line and you never lose a self-starter sale.

J. H. VALENTINE CO., Syracuse, N. Y.

The Valentine MANIFOLD STARTER and Gas Lighter

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Franklin D Touring

The big brother of the "Little Six"—a light weight, full size, five-passenger car, comfortable, speedy and economical.

Ability to Make Speed With Comfort

Makes Franklin model D the fastest touring car over the road. It is the first in at the end of the day's run and the occupants are not tired out.

Here Are the Specifications

Two types, a five-passenger touring car or a four-passenger torpedo-phaeton—six cylinders, thirty-eight horse-power.

Wheel base is 123 inches.

Full-elliptic springs and a wood frame—road shocks are absorbed.

Sheet aluminum body—light weight and will not rust, check or crack.

Tires 36 by 4½ inches front, 37 by 5 inches rear—larger than on any other car of the same size.

Price, $3500 for either type.

Light Weight on Large Tires—Low Tire Cost

Model D is a light weight car—and extra large tires are used.

It wears out fewer tires than any other car of its size because they are not overloaded.

Service averages from 8,000 to 10,000 miles per set.

Tire cost is reduced two-thirds.

A Safe Car to Drive

To drive a model D is a pleasure without fatigue to the driver or to the occupants.

It goes the farthest and the fastest in a day because it is the safest and most comfortable.

It runs longer and faster and makes more miles and more trips without mechanical troubles than any other car.

It follows the road easily—steering is without effort.

Franklin Air Cooling

In the Franklin system of air cooling the suction fan fly wheel regulates the amount of cooling.

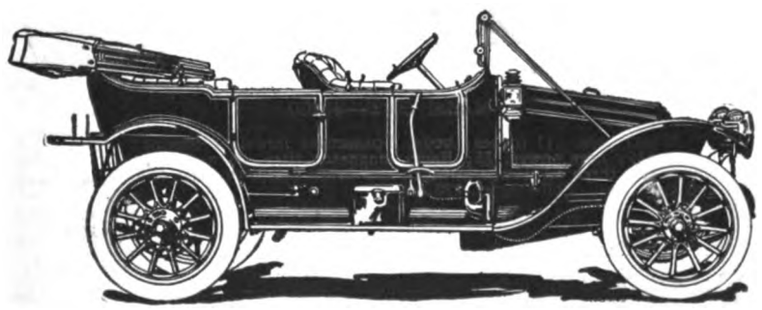
The faster the motor runs the greater the amount of air drawn around the cylinders.

Cooling does not depend upon the forward rush of the car, nor on a supply of water, nor on outside temperature.

As long as the motor runs it must cool.

The heat is literally wiped away—the supply of cooling medium never gives out.

Write for catalogue of all models.



FRANKLIN AUTOMOBILE COMPANY
Syracuse N Y

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Overland

OUR MODEL 60 has made motor car history. For $1200 the buyer gets what he cannot duplicate at less than $1500 in any other line.

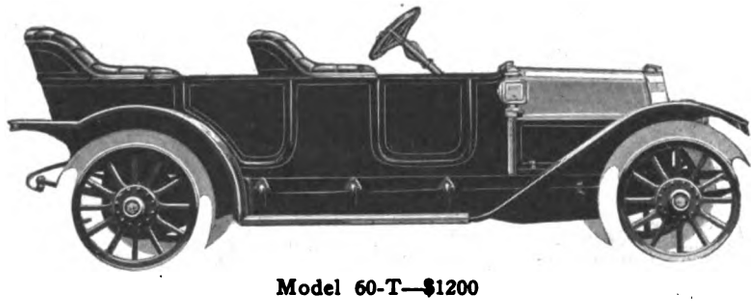
We mean this!

If $1200 can get you as much as $1500 why not save the difference?

Twenty-five thousand cars made under ninety-five per cent efficiency methods make this value possible.

Better investigate. Write for Book I-44.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4½ x 4½; horse-power, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, April 25, 1912. No. 5

DARK HEAD OF ELECTRIC PROJECT

Election of Officers Discloses Strong Men Engaged in Buffalo Merger—Merged Companies Not Yet Uncovered.

Having completed its preliminary arrangements, the Buffalo Electric Vehicle Co., which was incorporated last month, under New York laws, with $1,000,000 capital, elected officers on Monday last, 22nd inst., its personnel, as then disclosed, making plain that the enterprise would not lack substantial and influential backing.

The officers are as follows: President, Samuel J. Dark; vice-presidents, A. A. Landon and W. A. Morgan; treasurer, Harry Yates; secretary, Alfred W. Thorn. The directors of the company are Messrs. Dark, Landon, Morgan and J. T. Steele and John W. Van Allen.

President Dark is secretary of the Buffalo Dredging Co., secretary of the German-Bock Asphalt Co. and a director of the Commonwealth Trust Co.; Vice-president Landon is superintendent of manufacture of the American Radiator Co. and president of the Clark Motor Co.; Vice-president Morgan is district manager for Swift & Co., president of the Buffalo Taxi Co. and a director in the Buffalo Copper & Brass Rolling Mill; Treasurer Yates is first vice-president of the Union Furnace Co., treasurer of the Lafayette Hotel Co. and vice-president of the Commonwealth Trust Co.; Secretary Thorn is president of the Thorn Cement Co. and a director in the Commonwealth Trust Co. Director Allen is an investment broker and Director Van Allen a prominent Buffalo attorney.

The company represents a merger of five Buffalo concerns and will manufacture electric vehicles of all types.

Dorman Becomes Steinbock's President.

Frank D. Dorman, secretary of the United States Motor Co., has resigned that office to accept the presidency of the Steinbock Engineering Co., of Peekskill, N. Y., which recently was organized by H. E. Steinbock, who at one time was chief designer for the Maxwell-Briscoe Motor Co. Dorman's identification with the industry dates back to 1903, when he organized the American Motor Carriage Co., of Cleveland, Ohio. Three years later he became secretary of the Maxwell-Briscoe Co., subsequently becoming its vice-president, which office he occupied at the time it was taken over by the United States Motor Co. The Steinbock Engineering Co., as the Motor World previously stated, will manufacture a moderate priced car, designed by Steinbock, at a factory which will be located in New Jersey, in the vicinity of Newark. The experimental work has been completed in Mr. Steinbock's own shop in Peekskill, and the car probably will make its appearance before the summer has spent itself.

Can't Use Name "Krupp" in Any Form.

The Krupp Motors Co., of Pittsburgh, Pa., which planned to build a $600,000 automobile factory somewhere or other and which spurned, or said it spurned, the offer of a Chicago banking house to take over a bond issue of $5,000,000 if the company would create one, will have to find another name for itself. The injunction to that end, which was prayed for by Thomas Prosser, the American agent for the great Krupp Steel Works in Germany, was granted by the United States District Court last week. It restrains the Krupp Motors Co. from employing the name Krupp in any manner whatsoever. The company, which is said to have spurned $5,000,000 apparently thought so little of its name that it did not put in an answer and an appearance.

Studebaker Trademarks Name "Flanders."

The Studebaker Corporation has been granted a trademark on the name Flanders, as applied to automobiles, which, in view of reports that other interests had designs on that name, which has been current for some months, may or may not contain significance. Application for the trademark was filed on December 18 last, as applying to the name Flanders in a fancy script design.

LAMP LIGHTERS THREATEN TROUBLE

Barger Patent on Regulating Valve Brought to Bear and Litigation in Sight—May Affect Engine Starters.

After receiving notice from the Inst Lighter Co., of Columbus, Ohio, to cease infringement of its patent, No. 942,995, the Simkin Mfg. Co., of Chicago, makers of the Daisy lighter, made its peace to such good purpose that it not only agreed to recognize the validity of the Inst patent, but to pool issues with the Inst company and make common cause against other makers of automatic lighters and engine starters which employ pressure regulating valves.

The patent on the Simkin device has not yet been issued, but the Inst lighter, covered by patent No. 942,995, was granted December 14, 1909, to Frederick C. Barger, of Columbus, Ohio. It applies specifically to a "pressure controlling valve for automobile lamps" and in the description leading up to the single claim which constitutes the patent, the patentee states that it has "particular relation to a gas valve mechanism adapted to be used in conjunction with electrically ignited gas lamps of the class in which acetylene gas is conducted from a pressure tank to the lamp burners."

Unless the Simkin patent, which still is pending and the exact nature of which has not been disclosed, contains more far-reaching claims, it is not easy in the face of Barger's specific declarations to distinguish wherein his patent applies to engine starters. That it is the Inst-Simkin interests' purpose to proceed against manufacturers of the latter, however, is the assertion that comes directly from the parties interested.

The pressure-controlling valve covered by the Barger patent is thus described:

"In a pressure-controlling valve for automobile lamps, the combination with a valve casing body, having four externally threaded extensions thereon, there being a port extending between two of said extensions, a pair of separated valve seats located in

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said port, a cut-off valve threaded into another of said extensions and engaging one of said valve seats, a packing nut threaded upon said extension, a controlling handle carried by said valve and extending through said packing nut, a regulating valve threaded into the remaining one of said extensions and a packing nut through which said regulating valve extends, said packing nut being threaded upon the remaining one of said extensions, both the regulating valve and the cut-off valve being accessible and controllable from the exterior of the valve casing."

Expansion of the Wasson Piston Ring.

Its concentric piston having met with a remarkable measure of success, the Wasson Piston Ring Co. has increased its capital from $35,000 to $125,000 and removed from Bayonne, N. J., to a larger three-story plant at 1121-1123 Clinton street, Hoboken, where an output commensurate with the demand will be made possible. Coincident with the removal, Marshall F. Mills will become manager of the company, succeeding L. B. Berstein, who, however, retains his holdings in the company. The other officers are R. B. Wasson, president; E. R. Hewitt, vice-president, and M. L. Dunham, secretary-treasurer. Although not a great deal has been said of it, the Wasson ring really has made a great progress and now is employed by a number of prominent auto manufacturers, who have wholly discarded the long familiar eccentric ring, from which the Wasson differs in that its thickness, instead of being greatest at a point opposite the joint whence it gradually tapers to about half the thickness where the ends come together is the same for its whole circumference. Consequently the ring fills the whole groove in the piston, leaving no space, as the eccentric ring does, for the accumulation of oil and soot. In order to give the Wasson rings the proper elasticity, they are cut and then peen-hammered inside, the result being that an equal pressure is exerted all around the cylinder.

Again Enlarging Franklin Factory.

Ground will be broken, probably this week, for an enlargement of the H. H. Franklin Mfg. Co.'s factory in Syracuse, N. Y., which will afford 30,000 square feet of additional floor space. The new structure, 200x150 feet, will adjoin the present main factory building and will be devoted chiefly to the production of sundry parts and thus relieve congestion which has resulted from the increase in the Franklin business.

Gets Bosch Products For All Canada.

The Canadian Fairbanks-Morse Co., Ltd., of Toronto, has been appointed distributer of the Bosch magneto and other Bosch products for the entire Dominion. In addition to the main office in Toronto, the Fairbanks-Morse Co. maintains branches in eight other cities.

LAMBERT PLANT IN LOS ANGELES

Ohio Manufacturers Decide to Build on Pacific Coast—Will Produce Only Friction-Drive Farm Tractors.

Following a careful personal inspection of the field by J. W. Lambert, treasurer and general manager of the Buckeye Mfg. Co., of Anderson, Ind., the interests represented in that company are making ready to establish a factory in Los Angeles, or in the vicinity thereof. The Pacific Coast plant, however, will not produce Lambert cars or trucks, but will be devoted exclusively to the manufacture of the Lambert orchard and farm tractors, which recently have been developed at the Buckeye factory in Anderson, and for which a ready market has been found on the Pacific Coast. They incorporate the friction drive, which is the chief feature of the Lambert cars.

The four members of the Lambert family who control the Buckeye Mfg. Co., and who are its officers, will retain the controlling interest in the Los Angeles project, which, however, will be operated as a separate enterprise.

J. W. Lambert, who spent some time on the coast before a decision was reached, will shuttle between Indiana and California after the tractor factory is in operation and thus keep an eye on both properties. He is at present in California seeking the necessary factory site.

Why One "Star" Salesman is Missing.

Not so many weeks ago the Penfield Shock Absorber Co., of Meriden, Conn., acquired a "star" salesman who gave his name as Burton L. Burr, and proved of such engaging personality and so full of self-confidence that he offered to work on a commission basis in order to prove his worth. The Penfield people made terms with him, and Salesman Burr took to the road and in no time at all turned in whole sheafs of orders on which he duly collected his commission. Also in due course the Penfield company shipped the orders and suspected nothing until those to whom the goods were consigned refused to accept them and reported either that they had not seen Mr. Burr or had placed no orders with him. When Burr was called on to explain matters, he deemed it the better part of wisdom to disappear. At last accounts, he was still missing.

Jeffery-Dewitt Plans Ten Million Plugs.

Ten million spark plugs per year will be the capacity of the Jeffery-Dewitt Co. when the enlargement of its plant in Detroit, which now is in progress, is completed. The enlargement comprises a brick building 100x400 feet, which will be finished within thirty days. It will be devoted entirely to potteries for the porcelain for the J-D spark plugs—which are made from clay and other ingredients which are brought from Europe—and will permit of an output of 36,000 porcelains a day, which is at the rate of 10,800,000 per year.

Froelichs Enter the Tire Trade.

Jesse Froelich, who recently resigned the management of the Benz Import Co., of New York, but who retains his interest in the company and also in the Times Square Automobile Co., has organized the Mecca Rubber Co. which, about May 1st, will be ready for business at Broadway and 54th street, where it will act as Eastern distributors of Imperial tires. The company has not yet been incorporated, but Jesse Froelich will be its president, Morris Froelich its vice-president, and Louis Mensbach its treasurer.

Chicago Abandons Fall Truck Show.

The Chicago Automobile Trade Association has abandoned the truck show which it proposed to hold in the Coliseum next fall, and, it is announced, will withdraw its application for a sanction which had been filed with the National Association of Automobile Manufacturers. The action of the Chicago association was undoubtedly due to the fact that the N. A. A. M. had conveyed the intimation that it did not view with favor the proposed show.

Franklin Departs to Pacific Coast.

H. H. Franklin, president of the H. H. Franklin Manufacturing Co., of Syracuse, N. Y., departed last week for his annual visit to the Franklin branches and Franklin agents in the more populous centers. His itinerary includes Cleveland, Cincinnati, Chicago, Salt Lake City, Los Angeles, San Diego, San Francisco, Portland, Seattle, Spokane, Helena, St. Paul and Milwaukee.

Pope to Erect Four-Story Addition.

The Pope Manufacturing Co. is about to place contracts for a large addition to its plants in Hartford, Conn., which will be completed on or about September 1st next. The new building will be a four-story brick structure 192x72 feet. It will afford facilities neceessary for the production of the moderate-priced car which will be added to the Pope line next year.

Albion Plant a Hayes Subsidiary.

Mark Merriman, vice-president of the Hayes Wheel Co., of Jackson, Mich., who was reported to have purchased a plant in Albion, Mich., for the purpose of producing metal parts for automobile wheels, will not operate the factory on his own account. The Albion enterprise will be a subsidiary of the Hayes Wheel Co. itself.

Chalmers Swings Around Trade Circle.

Hugh Chalmers, president of the Chalmers Motor Co., of Detroit, is making a wide swing around the trade circuit. Among others he is visiting all the more prominent Pacific Coast cities, his trip reaching as far as Vancouver.

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BIG CORPORATION'S PROFIT-SHARING

United States Rubber Co. Makes Public Plan Finally Adopted—Bonus is Offered for Satisfactory Service.

After considering the subject for some three months, the United States Rubber Co., of which the United States Tire Co. is a subsidiary, finally has made known the plan whereby its employes will be permitted to share in the profits of the $100,000,000 company. It includes the distribution of common stock at $45 a share among all employes receiving a salary of $1,300 a year or over, subscriptions to be paid for in installments of not less than $4 per share a month. The plan will be followed out, if it is successful, in succeeding years, although the present market price of the stock, about $56 per share, will not, of necessity, remain in force.

In the words of Samuel P. Colt, president of the big company, the profit-sharing is designed "to further development of the interest, loyalty and efficiency of the salaried men in its service, and in that of its subsidiary companies, by giving them a special motive for acquiring or retaining an interest in the company's stock so as to make them substantially partners in the enterprise."

"For this purpose the company acquired in the market a large number of shares of its common stock at $45 per share, and is now offering it to its employes at this figure," continued Mr. Colt, "and the offer is limited to those receiving $1,300 a year and upward on the idea that they will best be able to meet the required payments of $4 per share per month without taking any undue financial burden.

"To make the privilege for subscribing at $45 still more attractive and also to make it the more probable that subscribers will retain their stock and so retain their interest in the company's welfare; it is proposed to give them a cash payment of $3 per share for each of the coming five years, provided subscribers retain their stock during that period and obtain a certificate at the end of each year that their services have been satisfactory to the company.

"To make the payments on the subscriptions less burdensome to subscribers, the company will distribute a certain profit-sharing fund among them. Any subscriber may, until it is fully paid, cancel his subscription at any time, and in that case, will be refunded all he has paid, together with interest of 5%. In case of the death of a subscriber during the five years, his family will receive the same benefit he would have received under these plans had he lived. Any fortfeiture caused by unsatisfactory services, or by termination of services, will inure to the benefit of the other subscribers."

If the plan works out successfully it is intended to make a similar offer in each suceeding year, the price of such future subscriptions, however, to be determined partly by the then prevailing market price of the stock and other existing conditions.

Henry Car "Gives up the Ghost."

Efforts to reorganize the bankrupt Henry Motor Car Co., of Muskegon, Mich., have proved vain and the business will be discontinued. The bid of C. E. Latimer, the heaviest stockholder in the company, did not avail, a higher offer made by Philadelphia parties for the cars on hand and other assets being accepted. The good will and repair business were purchased by the Muskegon Auto Co., with which A. R. Palmer, former president of the Henry company, is connected. It will keep on hand a supply of spare parts for Henry cars and promises prompt delivery thereof.

Body Builders Will Get Their Money.

The Moore & Munger Co., the New York body builders, were last week awarded the full amount of their claim against Wyckoff, Church & Partridge for the value of three bodies at $997 each, which the Wyckoff concern had ordered and refused to accept, despite the fact that it supplied the three chassis to which the bodies were to be fitted. The New York Supreme Court, which rendered the judgment, has ordered the chassis and bodies sold on Saturday next to satisfy the claim of the plaintiff in the action.

Vanguard Increases and Seeks New Site.

The Vanguard Mfg. Co., of Joliet, Ill., has increased its capital stock from $25,000 to $50,000, and its number of directors from three to five. The two new directors are W. H. Whitmore and William Thoeming; the old ones are C. F. Jensen, Edward Steinhart and Nathaniel Hurd. The added capital will be used in purchasing a newer and larger factory for the manufacture of Vanguard windshields, and it may or may not be located in Joliet.

Miller Carburetter Locates in Indiana.

Despite reports that it would locate in Detroit, Pittsburgh and elsewhere, the Miller Carbureter Co., of Los Angeles, finally has taken up its abode in Indianapolis, where temporary quarters have been secured in the Murphy Building. S. G. VanCamp, of the VanCamp Hardware Co., of Indianapolis, is interested in the carburetter company and was instrumental in inducing it to locate in the Indiana metropolis.

Fowler Takes Over Carburetter Plant.

The Fowler Lamp & Brass Co., of Chicago, Ill., which recently acquired the Roberts Brass Mfg. Co., of that city, has also taken over the Reisenbach Laboratories Co., manufacturers of Vortex carburetters, and the entire business has been concentrated in the Fowler Building on East 24th street, Chicago. The facilities of the several departments will be considerably enlarged.

"TRADE TALK" NOT VALID EXCUSE

Michigan Court Rules on Claims Made by Salesmen and Indicates Responsibility —Litigation Over Trucks.

In Michigan so many cars are made and so many people are making them and selling them, by methods high sounding and otherwise, that the decision of the Supreme Court of the State recently rendered in the case of Hall vs. Duplex-Power Car Co. cannot fail to give pause to those who are more or less inclined to the use of extravagant claims and phrases in advertising or otherwise prosecuting the sale of their wares. The case in question, Eugene H. Hall, of Kansas City, Mo., late in 1909 secured the sales agency for the Duplex four-wheel drive truck, placing an order for three vehicles with their makers, the Duplex-Power Car Co., of Charlotte, Eaton County, Mich.

The vehicles were duly delivered, but failed to stand up and were accordingly returned to their manufacturers and a demand made for a settlement, which was refused. The Kansas City man then entered suit in the Circuit Court for Eaton County, Mich., claiming fraud and deceit and breach of an implied warranty. After hearing the evidence, which included testimony of Morris Bollstrom, the inventor of the Duplex drive, to the effect that the vehicles delivered to Hall were undeveloped and unsatisfactory and were shipped contrary to his protest, the court directed a verdict for the defendant. Hall, however, appealed from the decision and the higher court just has reversed the "court below" and ordered a new trial, holding (1) That the undertaking of the defendant to replace all defective parts constituted an express warranty and there could be no implied warranty as to the workmanship and proper assembling of the machines. (2) That defendant's oral representations as to tests made, what the cars would do, the class of workmanship and materials used made a question for the jury upon the question of fraud and deceit, and it was an error to direct verdict.

"Where, in a contract for the manufacture of machines there is an express warranty that all the machines shall be like the sample, no other warranty can be implied," said the court, which also added:

"One who purchases property in the belief of, and reliance upon, false statements regarding it, may sue for and recover the damages occasioned thereby, whether the representations are made in good or bad faith."

One of the exhibits which the plaintiff brought to bear was the advertising literature of the Duplex company. Among other things it dealt with the Duplex vehicles in this florid, but not uncommon, fashion:

"You can pay more, but you cannot buy another delivery in America that can be

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depended upon to run the year 'round through mud, slush and snow."

"This car will do more work than two horse drawn rigs; with one less driver, costs less to maintain; quicker deliveries, well pleased customers. More of them."

"A ten passenger bus that you won't have to leave in the garage because of the mud or snow. Artillery wheels if you prefer them."

"This is the 1,000 lb. capacity car that beat two double teams 4½ hours in a day's laundry delivery. Making a total of 115 miles on 9½ gallons of gasolene."

"Not a car offered for sale until they had made good on every kind of road in this country and they never flunked."

"Remember these cars are not assembled jobs, simply put up to sell to people who do not know the difference, but they are manufactured in our own plant where nothing but commercial cars are built, by men who gave their entire time and thought to the construction of the best commercial cars ever produced in America."

Hall testified that F. A. Messler, the secretary of the Duplex company, talked along these same lines—told of the "great stunts" the trucks performed, of their surpassing quality and workmanship, etc., and though the defendant's lawyer tried to dismiss such assertions as "trade talk not amounting to material representations relied on by the plaintiff," the higher court, in dealing with that phase, said:

"Bearing in mind the nature of the representations testified to, and the entire inexperience of the plaintiffs in handling automobiles of this or any other kind, and the testimony tending to show the falsity of the representations, we must hold that there was sufficient evidence introduced in support of the count for fraud and deceit, to entitle the plaintiff to go to the jury upon this question. If it is a fact that these statements were made and relied upon by the plaintiffs, and induced plaintiffs to enter into the contract, and were false in fact, it is immaterial whether Mr. Messler believed them true."

Lamp Meeting That Threw No Light.

If the New York correspondent of the Cincinnati Enquirer is to be believed, a meeting was held in a prominent Broadway hotel one day last week, at which interests representing the United States Motor Co., the General Motors Co. and the Studebaker Corporation, took steps toward the organization of still another company which will manufacture the lamps, if not other accessories, used by the several big corporations. If such a meeting was held, officials of the United States Motor Co., at least, know nothing about it. Alfred Reeves, one of the vice-presidents of the company, laughed heartily when it was repeated to him and suggested that it was merely another variation of the United States Motor-General Motors-Studebaker merger which has given rise to "newspaper dreams" on previous occasions.

STEARNS' VIEW OF THE SITUATION

Cleveland Company's Vice-President Surveys Business Conditions and Sees Few Clouds—What Orders Indicate.

When a man is ill, and more particularly when he is convalescing, he has time and opportunity for thoughts and surveys of situations for which he has less inclination, or less opportunity, when in full health and engaged in the rush of the work-a-day world. Roy F. York, vice-president of the F. B. Stearns Co., of Cleveland, Ohio, recently found himself in such a situation. He underwent an operation for a severe attack of appendicitis, and during his convalescence he devoted himself to an exhaustive study of business conditions in general and the automobile trade in particular. His opinions therefore are apt and of real interest.

"I closely analyzed the reports sent in by our branches, our dealers and our traveling supervisors," he said in remarking his conclusions, "and have gone very closely over the selling situation with the members of our sales committee, who direct the sales policy of the Stearns company.

"From all these sources and many others, I have come to the conclusion that the automobile business will not only finish the present season in flourishing condition, but will swing into the next season's business with more impetus than it has ever known before.

"These beliefs are not only based on the most careful study of the situation as a whole, but are conservative.

"I have gone over our own business in a more exhaustive manner, and I am proud to say that every branch and dealer on our books has shown a splendid increase. Probably the greatest increase of any is shown in New York. Since we organized the F. B. Stearns Co., of New York, about a year ago, and installed our sales offices and service building, our sales have increased wonderfully. Not only that, but the entire country east of the Allegheneys has shown a most wonderful increase.

"This does not mean that the western territory is not also increasing, for it is giving splendid results, especially on the Pacific coast.

"Our business so far is approximately 100 per cent. over last season, when, of course, we did not have the advantage of the Knight type motor. This means that our branches and dealers are doing from 150 to 200 per cent. more business. I find that practically all the companies building cars of standard quality are reporting good conservative increases over previous seasons. Our sales supervisors, who are in close touch with trade conditions all over the United States, believe that practically all the companies manufacturing cars of the better quality are having splendid seasons.

"I attribute this not only to the splendid cars being built today, but to the general business health of the country. The very few sections of the country, where business is somewhat slow, are the rare exceptions."

Indianans Take up a Tire Filler.

The Indiana Tire Filler Co., which just has been incorporated in that State with $25,000 capital, has located at 330 North Illinois street, Indianapolis. The officers are as follows: R. C. Ellis, New Albany, Ind., president; F. F. Wiley, Edinburg, Ind., vice-president; F. T. Mitchell, Chicago, Ill., secretary and treasurer. In addition to the officers, the directors are H. H. Woodsmall, of Indianapolis, and C. W. MacReynolds, of Kokomo. The company will manufacture a liquid filling compound, styled "Rubberine," which is the discovery of a New Orleans chemist, and which is claimed to be "almost as resilient as air."

More Money in Pittsfield Spark Coil.

The Pittsfield Spark Coil Co., of Dalton, Mass., has increased its capital stock from $100,000 to $250,000 and will use the new capital for the purpose of installing new machinery and otherwise increasing its facilities for the manufacture of magnetos, coils, spark plugs, etc. At the meeting of the company, at which the increase of capital was voted, William P. Wood was elected president and Louis B. Hopkins treasurer, who, with Zenas Crane and Michael Casey, will constitute the board of directors.

St. Louis Tradesmen Select Their Leaders.

At the annual election of the St. Louis Automobile Manufacturers' and Dealers' Association, the following officers were chosen: President, Frank R. Tate; vice-president, W. C. Anderson; treasurer, Samuel Breadon; secretary, Robert E. Lee. The directors are H. B. Krenning, John H. Phillips, E. P. Rhodes, O. L. Halsey, C. Gratiot Cabanne and T. L. Houseman.

Michigan Welding Company Enlarges.

The Michigan Electric Welding Co., of Detroit, which recently absorbed the Detroit Electric Welding Co., has acquired the property in Detroit formerly occupied by the Universal Radiator Co. and is removing thereto. The property comprises three buildings and sufficient land on which another three-story concrete structure will be erected.

Latta Made U. S. Motor's Secretary.

L. A. Latta has been elected secretary of the United States Motor Co. to succeed Frank D. Dorman, who resigned the office to become president of the recently organized Steinbock Engineering Co. Previously Latta was secretary of the Maxwell-Briscoe Motor Co. so that he is not strange to his surroundings.

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THE WEEK'S INCORPORATIONS




Detroit, Mich.—Republic Motors of Michigan, under Michigan laws, with $20,000 capital.

Gray, Me.—Gray Auto and Supply Co., under Maine laws, with $10,000 capital; to operate a garage.

Seattle, Wash.—Seattle Auto and Freight Co., under Washington laws, with $10,000 capital; to deal in automobiles.

Wilmington, Del.—Sanitary Service Co., under Delaware laws, with $10,000 capital; to deal in motor car attachments.

Windsor, Ont.—National Body Co., under Canadian laws, with $100,000 capital; to manufacture automobile bodies.

Vincennes, Ind.—Traction Appliance Co., under Indiana laws, with $35,000 capital; to manufacture motors. Corporators—F. C. Morgan, G. E. Henry, J. J. Risch.

Anderson, Ind.—R. S. Brown Co., under Indiana laws, with $2,000 capital; to deal in motor cars. Corporators—R. S. Brown, Robert L. Colding and others.

Chicago, Ill.—D. A. Bonitz Co., under Illinois laws, with $5,000 capital; to deal in tires, etc. Corporators—Thomas M. Benner, Frank P. Paterson and others.

Wilmington, Del.—Elastic Wheel Co., under Delaware laws, with $1,000,000 capital; to manufacture spring wheels. Corporators—S. C. Hatfield, G. W. Smith, I. Fogg.

Chicago, Ill.—Transcontinental Touring Club of America, under Illinois laws; to develop motor touring. Corporators—Enos A. Hates, Harry C. Drum, Marvin O. Bates.

Chicago, Ill.—Logan Square Garage Co., under Illinois laws, with $2,500 capital; to operate a garage. Corporators—Edward S. Thurtell, Alfred Thurtell, Horace G. Sweet.

New York, N. Y.—Dual Wheel Co., under New York laws with $300,000 capital; to manufacture automobile wheels, etc. Corporators—F. B. Cochran, A. Dow, C. W. Jewell.

Detroit, Mich.—Maxeff Electric Horn Co., under Michigan laws, with $15,000 capital; to manufacture motor vehicle horns. Corporators—Ard. E. Richard and others.

Salem, Mass.—Salem Oil and Grease Co., under Massachusetts laws, with $25,000 capital; to deal in lubricants. Corporators—A. H. Rowbotham, H. T. N. Smith and others.

New York, N. Y.—Tire Core Co., under New York laws, with $100,000 capital; to manufacture tires, rims, etc. Corporators—R. V. Stuart, P. J. O'Connell, H. P. Reader.

Chicago, Ill.—Columbus Livery Co., under Illinois laws, with $6,000 capital; to conduct a motor livery. Corporators—Charles F. Thomas, Louis Kummerow, Ernest H. C. Wegner.

Portland, Me.—Railway Storage Battery Car Co., under Maine laws, with $4,000,000 capital; to manufacture battery cars, etc. Corporators—C. E. Eaton, C. L. Croteau and others.

Chicago, Ill.—Mid-West Auto Supply Co., under Illinois laws, with $50,000 capital; to manufacture automobile supplies. Corporators—S. G. Camp, Clarence Joseph, B. H. Rifenbark.

Indianapolis, Ind.—Hampton Mfg. Co., under Indiana laws, with $5,000 capital; to manufacture automobile accessories. Corporators—S. B. Nussbaum, S. Allmann and W. Hampton.

Chicago, Ill.—Fred Allen Automobile Supply Co., under Illinois laws, with $10,000 capital; to deal in motor requisites. Corporators—W. E. Kaiser, F. L. Horton, Percival Steele.

Chicago, Ill.—Brazil Tire and Vulcanizing Co., under Illinois laws, with $5,000 capital; to deal in and repair tires. Corporators—B. H. Bellman, Richard Leseth, Edward Lansberg.

Superior, Wis.—Continental Truck Mfg. Co., under Wisconsin laws, with $50,000 capital; to manufacture motor trucks. Corporators—E. M. Anderson, J. S. Barnsdale and others.

St. Louis, Mo.—Pennsylvania Automobile Co., under Missouri laws, with $10,000 capital; to deal in motor cars. Corporators—William A. Fortner, Claude D. Fortran, George P. Burleigh.

Buffalo, N. Y.—South Buffalo Garage, Inc., under New York laws, with $10,000 capital; to operate a garage. Corporators—William Coatsworth, Leon R. Jenkins and Mary L. Coatsworth.

Indianapolis, Ind.—Scheidel-Thompson Mfg., Co., under Indiana laws, with $50,000 capital; to manufacture automobile parts. Corporators—George I. Schellig, Bert Thompson and others.

Utica, N. Y.—Buick Sales Co., under New York laws, with $5,000 capital; to deal in motor cars. Corporators—George Beatty, Arthur Beatty and Emma Beatty, all of 143 Park avenue.

Terre Haute, Ind.—Vigo Mfg. Co., under Indiana laws, with $25,000 capital; to manufacture auto parts. Corporators—J. R. Finkelstein, R. G. Jenckes, Jr., L. M. Eyke and W. M. Lewis.

Kansas City, Mo.—Stephens Motor Tire Co., under Missouri laws, with $5,000 capital; to manufacture and deal in motor car tires. Corporators—A. J. Stephens, William H. Hall, E. J. Short.

Rye, N. Y.—Motor Mail Transportation Co., under New York laws, with $60,000 capital; to conduct a mail delivery business. Corporators—J. J. Cassidy, H. G. Warnock, W. C. Prime, all of Brooklyn.

Columbus, Ohio—State Auto Sales Co., under Ohio laws, with $10,000 capital; to deal in motor cars. Corporators—Mark B. Mead, George F. Hammond, W. G. Fligle, B. S. Dorrance, B. R. Dorrance.

Indianapolis Ind.—Vixen Motor Co., under Indiana laws, with $12,000 capital; to manufacture motor cars. Corporators—F. C. Schmid, W. J. Harris, C. O. Van Horn, S. B. Lindley and D. K. Lindley.

Chicago, Ill.—Byam International Autotire Co., under Illinois laws, with $50,000 capital; to manufacture automobile tires and accessories. Corporators—W. W. Byam, E. C. Byam, W. A. Scott.

Cleveland, Ohio—Universal Lubricating Co., under Ohio laws, with $100,000 capital; to deal in oils and greases. Corporators—S. W. Scofield, C. B. Emery, C. B. Arthur, T. H. J. Williams, Jr., E. Dreher.

Jersey City, N. J.—Unique Vulcanizer Co., under New Jersey laws, with $50,000 capital; to do a general automobile business. Corporators—J. H. Hutten, J. P. Becker, U. C. Huber, E. R. Hussey.

New York, N. Y.—Auto Import and Specialty Co., under New York laws, with $15,000 capital; to deal in automobile supplies. Corporators—Leo Kahn, Edwin P. Weiss, Hans Gurlitt, all of 1777 Broadway.

Cincinnati, Ohio—K. D. Carburetter Co., under Ohio laws, with $5,000 capital; to manufacture automobile supplies. Corporators—C. A. Riemenschneider, Harry C. Cahn, E. L. Fraser, C. W. Shimmon.

Yonkers, N. Y.—Park Hill Auto Co., under New York laws, with $15,000 capital; to deal in motor vehicles. Corporators—Eris Drewitz, Emil Drewitz and Paul T. Ellenbogen, all of 336 New Main street.

Alexandria, Va.—Capital Garage and Service Co., under Virginia laws, with $125,000 capital; to operate a garage. Corporators—Louis T. Cowle, Joseph B. Chaplin, Eugene A. Jones, all of Washington, D. C.

Cleveland, Ohio—B. & B. Mfg. Co., under Ohio laws, with $35,000 capital; to deal in motor car parts and accessories. Corporators—W. E. Smith, R. L. Bacher, W. R. Bauman, L. C. Heinberger, I. T. Quick.

Roslyn, N. Y.—Roslyn Garage, Remsen

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& Hewlitt, Inc., under New York laws, with $15,000 capital; to deal in motor cars and operate a garage. Corporators—Samuel L. Hewlitt, John F. Remsen and Nora H. Remsen.

Granville, N. D.—Nordmarken Mechanical Motor Co., under North Dakota laws, with $10,000 capital; to manufacture internal combustion motors. Corporators—C. A. Stubbins, O. M. Erickson, J. J. Muus, all of Granville.

Brooklyn, N. Y.—T. F. P. Co., under New York laws, with $1,000 capital; to deal in motor cars. Corporators—E. Mulder, 626 West 136th street; F. W. Olmstead, 569 Madison avenue; John R. Mulder, 1531 Broadway.

Detroit, Mich.—England Manufacturing Co., under Michigan laws, with $50,000 capital; to manufacture steel automobile bodies. Corporators—Fred England, John W. Foster, J. Albert Davis, all of Amesbury, Mass.

Brooklyn, N. Y.—Royal Auto Co., under New York laws, with $600 capital; to deal in motor cars. Corporators—Harry Baumann, 178 Hewes street; William Gerdes, 482 Franklin avenue; Abraham Levy, 53 Clark street.

Cleveland, Ohio—Guide Motor Lamp Mfg. Co., under Ohio laws, with $100,000 capital; to manufacture automobile accessories. Corporators—H. J. Monson, W. F. Persons, W. H. Bunce, J. D. Kauffman, W. L. Rose.

New York, N. Y.—Auto Holding Co., under New York laws, with $10,000 capital; to deal in motor cars. Corporators—Minor O. Russ, 1047 Stebbins avenue; Harry Edwards, 567 West 186th street; Alfred Bernstein, 3089 Broadway.

New York, N. Y.—Ohio Tire Co., under New York laws, with $500 capital; to deal in vehicle tires. Corporators—Samuel Kessel, 1405 Forty-second street, Brooklyn; Fanny Karpowitz and Max Karpowitz, both of 166 South Second street, Brooklyn.

New York, N. Y.—Auto Transportation and Sales Co., under New York laws, with $1,000 capital; to deal in motor vehicles. Corporators—Edward E. Manning, 734 Eighth avenue; William Lanasseadel, 966 Stebbins avenue; J. Martin Burke, 54 West 113th street.

New York, N. Y.—Long Island Truck Co., under New York laws, with $3,000 capital; to deal in motor vehicles. Corporators—William L. Woodhill, 132 Fourth street; Peter J. Fisher, 61 West Eighty-sixth street; Wilson J. Backman, 149 West Sixty-sixth street.

New York, N. Y.—Rubber-Aer Co., under New York Laws, with $25,000 capital; to manufacture automobile tires. Corporators—Daniel B. Crane, Jr., 4164 Brander street, Woodhaven; Ernest Lavoie, 113 Seventh avenue; Hugh M. Smith, 222 Clark street, Westfield, N. J.

Buffalo, N. Y.—Autoaro Pump Co., under New York laws, with $1,000 capital; to manufacture pumps, etc. Corporators—Walter W. Cohen, 403 Potomac avenue; Louis K. Schwartz, 210 West Seventy-sixth street, New York City; Michael M. Cohen, Mutual Life Bldg., Buffalo.

Changes Among Prominent Tradesmen.

F. J. Posta has been appointed sales manager for the Harder Auto Truck Co., of Chicago. Previously he was connected with the Kissel Motor Car Co.

George T. Homeier has been appointed superintendent of the Streator Motor Car Co., of Streator, Ill. Previously he was connected with the General Motors Co.

George B. Pieper has been appointed manager of the Remy Electric Co.'s branch in Boston, Mass. Pieper has been identified with the automobile trade in several capacities for many years.

Fred J. Urban has been appointed special representative for the Remy Electric Co. in the middle west. He will make his headquarters at the Chicago branch and that city, of course, and Detroit will be included in his territory.

A. A. Franklin, former advertising manager for the Haynes Automobile Co., of Kokomo, Ind., has become identified with the Apperson Bros. Automobile Co. of the same city. C. E. Stolte, former traffic manager at the Reo factory at Lansing, Mich., also has been added to the Apperson staff.

W. S. Jewell, at one time manager of the Franklin branch in New York and more recently with the Kelly Motor Truck Co., has been appointed eastern sales manager for the R-C-H Corporation. He will make his headquarters at the R-C-H branch in New York, at 1989 Broadway. Jewell succeeds R. J. Lacair, who recently resigned his position.

W. T. Reynolds, for the past three years manager of the Franklin branch in Pittsburgh, Pa., has been appointed sales manager for the Lippard-Stewart Motor Car Co., of Buffalo. Previous to his connection with the Franklin company, Reynolds was engaged in the automobile business on his own account in Philadelphia, where he operated the Rittenhouse Garage, which was a John Wanamaker enterprise.

Queer Garage Situation in Detroit.

Opposition to the erection or maintenance of public garages in residential neighborhoods is an old story, but the situation in which the Kales Realty Co., of Detroit, Mich., finds itself proves more than usually peculiar. It owned an 82-foot lot on Woodward Avenue Terrace, in Detroit, on which it desired to erect a garage, but the residents of the neighborhood promptly sued for an injunction, alleging that when that section of the city was platted restrictions were imposed that forbade the construction of such a building. The Realty company contended that the restrictions covered only the northerly 10 feet of the lot, if it covered any part of it, and as the locality is now a business district the restrictions had been nullified. The complainants, however, held that the restriction, by an old lease, covered the whole lot. After the long wrangle, the court ruled that a garage might be erected on the southerly 72 feet, but that not even a carriage driveway could be laid out on the restricted 10 feet, so that the Realty company is, figuratively, "up against it," with a 10-foot waste on its hands. It claims that the court's decision renders the lot useless and has announced its intention of carrying the case to the Supreme Court of the State of Michigan.

Detroit Prepares To Receive S. A. E.

Detroit having been awarded the midsummer meeting of the Society of Automobile Engineers, and having set June 27, 28 and 29 as the dates, now is planning to receive and entertain its guests in a manner befitting the "automobile capital of the world." Hotel Pontchartrain has been designated official headquarters and the place for the several business meetings, the remaining details being in the hands of the following committees:

Entertainment—H. E. Coffin (chairman), Hudson Motor Car Co.; H. W. Alden, Timken-Detroit Axle Co., and Russell Huff, Packard Motor Car Co. Finance—H. M. Leland (chairman), Cadillac Motor Car Co., and Tracy Lyon, General Motors Co. Transportation—F. H. Floyd (chairman), E. E. Sweet, Cadillac Motor Car Co., and H. R. Corse, Lumen Bearing Co. Hotels—G. W. Dunham (chairman), Chalmers Motor Co.; F. H. Berger, Oakland Motor Car Co., and J. G. Vincent, Hudson Motor Car Co.

Peerless Floats Million Dollar Issue.

Chiefly for the purpose of its truck department and to pay off its floating debt, the Peerless Motor Car Co., of Cleveland, has floated an issue of $1,000,000 6 per cent. bonds, maturing in 12 months, the entire issue having been taken by a local banking syndicate. The company also has added $300,000 to its capital stock.

Fisk Completes New Home in 'Frisco.

The Fisk Rubber Co. last wek took possession of the new branch in San Francisco, which was erected for its occupancy. It is located on Van Ness avenue, near Pine street, and comprises a two-story reinforced concrete structure, 50x150 feet, and is characterized by uncommonly handsome appointments.

Croxton to Remove from Cleveland.

The Croxton Motor Co., of Cleveland, has completed negotiations which will result in its removal to Washington, Pa. The new plant secured at that point will enable the Croxton people to better carry out the plans which they have made for the future conduct of their business.

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J. W. Cowan is building a garage in Yoncalla, Ore.

E. C. Crosby is erecting a garage in Brattleboro, Vt.

George Henschel is preparing to build a garage in Bayside, N. Y.

B. B. Clukey has opened a garage and repair ship in Massena, N. Y.

A garage, 40 x 60 feet, is being erected for George von Lienen in Moulton, Tex.

E. W. Bird has opened a salesroom in Fairmont, Minn. He handles the Nyberg car.

Michael Fogarty and David Lowers have opened a garage and salesroom on Johnston street, Newburgh, N. Y.

The American Auto Co., of Davenport, Ia., has become possessed of a new garage. S. M. Reck is its manager.

The Mercury Auto Co. has been formed in Wilkinsburg, Pa.; R. H. Stockton is at the head of the enterprise.

Under the style Narrows Garage, J. T. Bishop, of Onset, Mass., has opened a garage in Wareham, Mass.

Bishop, Texas, soon will have a real garage " in its midst;" H. W. Leslie, of Galveston, is building one there.

D. S. Patterson has embarked in the automobile business in Nashville, Tenn. He will represent the Marvin exclusively.

Ernest L. Jones is building a garage in Vermontville, Mich. It will be a frame structure, with concrete floors, 24x36 feet.

The Bergdoll Motor Co., of Philadelphia, Pa., has established a branch in Kansas City, Mo. Ivan Mitaiewitz is in charge of it.

H. S. Parker has opened a garage in Camas, Wash. He will also make a specialty in rebuilding and selling second-hand cars.

Fred J. Smith has opened a salesroom and garage at 5218 Evanston avenue, Chicago, Ill., where he will show Carhartt cars.

The Lion Motor Sales Co. of West Virginia has been organized at Huntington to handle the sale of the Lion car in that State.

J. A. Morrison has entered the tire repairing business and "opened up" in the Eugene Race building, on Main street, Glens Falls, N. Y.

The United States Tire Co. has opened three more branches—in Des Moines, Ia.; Richmond, Va., and Jacksonville, Fla., respectively.

The White Pole Garage is the style of a new garage which is being built in Anita, Iowa. William Biggs and Ira Bontrager are the owners.



VIEW OF THE NEW RAMBLER SERVICE BUILDING IN CHICAGO AS IT WILL APPEAR WHEN COMPLETED

The Dove Machine Co., Inc., has opened a garage at 316 South Broadway, Lawrence, Mass.

C. B. Enfield has opened a salesroom and garage at Raleigh, N. C. He will handle Cadillac cars.

Frank Calkin has rented the Bearss buildingk in Danville, Ill., and is converting it into a garage.

Bert Lane and Arthur Parks have entered into a partnership and opened a garage in Patchogue, N. Y.

Leonard Edwards is preparing to open a garage and repair shop at 254 Huntington street, Wabash, Ind.

N. V. and H. N. Porter have opened a garage in New London, Conn.; they will handle Maxwell cars.

The Cosgrove Co., of Le Sueur, Minn., has taken over the garage formerly operated by Howard Hellen.

The Elgin (Ill.) Light and Power Department of the Aurora-Elgin-Chicago Co. has taken on electric vehicles. It will handle the Woods car.

The Everitt Auto Co., of Baltimore, Md., has added motor trucks to its lines of passenger cars; it will handle the Board truck in the State of Maryland.

Reed & Duval have purchased the building upon the corner of Superior street and Sixth avenue, Antigo, Wis., and are remodeling it into a garage.

H. M. Paine has organized the Paine Automobile Co. and opened a garage at 419 North Euclid avenue, St. Louis, where he will handle the Lion car.

The Riverside Motor Co., composed of Rupert Rumelhart, J. Scott Benson and John Rath, has opened a new garage in

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the A. Lear Building in Davenport, Ia. Case and Maxwell cars are handled.

George Babb has engaged in the automobile business in Champaign, Ill., and taken the agency for Inter-State cars. His salesrooms are on Walnut street.

The Peden Iron & Steel Co., dealer in hardware and implements at Houston, Tex., has taken on automobiles; it will distribute Brush cars in Southern Texas.

D. C. Cockley, manager of the Liberty Lake Boat Co., has entered the automobile business and opened a supply and accessories store at Liberty Lake, Wash.

Fred F. Folger has purchased the garage and repair ship of the Warner Automobile Co., Watertown, N. Y., and will continue the business under his own name.

Schroder & Peterson, of Davenport, Ia., N. Y., have filed partnership and individual petitions in bankruptcy. Their liabilities are $10,000, and their assets $875.

A new company has started business in Galveston, Tex., under the style Reliance Auto Repair & Sales Co., with salesrooms at 2216 Postoffice street. Austin, Regal and Chalmers cars will be handled.

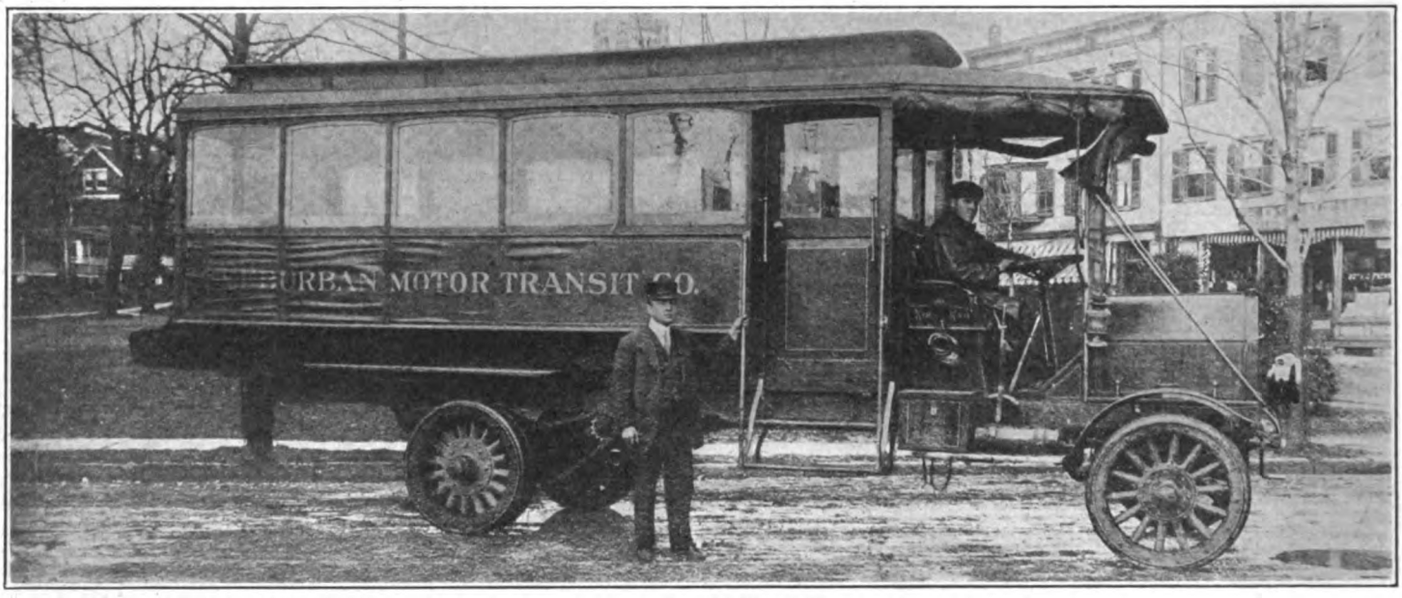
Becoming convinced that the horse livery business has seen its best days, R. T. White, of Anawan, Ill., has relinquished it and become an automobile dealer. He is handling the Studebaker productions.

E. Walker, president of the Walker Ice Cream Co., has embarked in the automobile business in Warren, Pa. He will handle the Lion car in Chautauqua County, New York, and Forest County, Pennsylvania.

The Northern Automobile Agency has Snyder, automobile repairers at 1926 Broadway, New York City, has filed a petition in bankruptcy. The individual liabilities are $1,433, and assets $26. The firm liabilities are $1,010, and assets, $358.

The Van Brunt Automobile Co. is the style of a newcomer on Omaha's "automobile row." In its salesrooms at 293 South Nineteenth street, it will show Overland cars. William H. Wallace, formerly president of the Wallace Automobile Co., is manager of the new concern.

The Oakland Garage, at 497 Central avenue, East Orange, N. J., has purchased the entire business and assets of the Central & Grove Auto Co., at 92-96 Central avenue, in the same town. The old location of the Oakland Garage will be used as a garage and service station, while the Central company's quarters will be equipped as salesrooms for Oakland cars.



KISSEL BUS IN WINTER SERVICE BETWEEN WHITE PLAINS AND PORTCHESTER, N. Y.

who previously restricted themselves to the repair business, have enlarged their sphere and taken the agency for Metz cars.

Warren and Krit cars are to be handled by the W. G. Bell Motor Car Co., which just has "opened up" in Austin, Tex. Its salesrooms are 415 Congress avenue.

Lorin Abbe has purchased the garage and salesroom of the Ed. T. Evans estate, at Eagle Lake, near Galveston, Tex. He will do business under the style Eagle Lake Motor Car Co.

The American Motor Car Co., of Fourth and Church streets, Charlotte, N. C., has changed hands and is now solely controlled by the Rutzler brothers. George F. Rutzler will be active manager.

H. Peterson, for some time connected with the Newark branch of R. M. Owen & Co., has gone into business on his own account. He has opened a repair shop at 8 Canfield street, Newark, N. J.

Edward J. and Roy C. Vrooman, dealers in automobiles and supplies at Schenectady, opened salesrooms in the premises formerly occupied by the Fox Automobile Co., South Twentieth street, Birmingham, Ala. The new company handles Cole and Everitt cars.

The Richardson Motor Car Co. has opened a garage for electric vehicles at 27-29 Essex street, Newark, N. J. Besides operating a charging station and repair shop, the company will handle Johnson cars.

Norman B. Ross and J. W. Northrup have formed a partnership for the purpose of taking over the business of Norman B. Ross, on Putnam street, Saratoga Springs, N. Y. They will operate under the style Ross Garage Co.

Under the style Millward & Whitt a new firm has commenced business at 765 Tenth street, Riverside, Cal. Both partners formerly were employed in the Chalmers factory in Detroit, and will cater especially to Chalmers owners.

Thomas A. Quinn, formerly of Quinn &

As a result of an application filed by John H. Nolan, president of the company, Harold M. DeWitt has been appointed receiver for the Pope Automobile Co., of Washington, D. C. In his application for the receiver Nolan stated that he owned a controlling interest in the company and that its debts, approximately, amount to $18,881 and its assets to about $12,137.

The style of the W. Wayne Davis Co., Philadelphia distributor of Everitt cars, has been changed to Hunter-James Co. Simultaneously with the change of name a reorganization has been effected by which David T. James, formerly assistant sales manager of the Metzger Motor Car Co., Detroit, purchased one-half of the interest, while the other half was acquired by S. D. Hunter, formerly a member of the Wayne-Davis Co. James, before going to the Everitt factory, was in charge of the truck sales department of the Carl H. Page Co., of New York, when it handled the Morgan truck.

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THE MOTOR WORLD

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ENGINE STARTERS AND ADVERTISING FOR TRUCKS.

It would seem that pleasure car manufacturers have sort of stolen a march on a majority of the commercial vehicle makers in so readily taking up the engine starter. There can be no doubt but that the engine starter is a boon and a blessing on a pleasure car, even though the number of times it may be called upon are comparatively few. But a motor truck is quite another proposition. The nature of its work generally is such that frequent stops for discharging merchandise are necessary. Inasmuch as it is perfectly apparent that an idle truck is a drain on resources and that an idle truck with its engine running as well, eating up gasolene and oil, must be a greater drain, it would seem that there are abundant possibilities for the engine starter in the commercial vehicle field.

A few manufacturers already equip their trucks with engine starters but the majority of them still rely upon the muscle of the driver, and it might be said in passing, that there are not many drivers who are prone to exercise their muscle a couple of hundred times a day in the particular manner that is suggested by an idle engine. At the least, an engine starter would encourage the driver to stop his engine when he stopped the vehicle to make deliveries, and even if it did not pay for itself immediately in gasolene and oil and wear and tear saved, it certainly ought to return dividends on the investment.

In this respect the electric engine starting and lighting system suggests itself as particularly applicable to commercial vehicles. In its various forms, as it is manufactured today, it does not require attention that is worth mentioning, it is not unnecessarily complicated, and its most valuable feature is a practically unlimited source of current that may be put to a variety of uses. And not the least valuable of the uses to which the current may be put is in advertising.

Admittedly, some of the very best advertising is accomplished with the aid of electric signs. With an electric engine starting and lighting system installed on a commercial vehicle, the owner is afforded an unsurpassed advertising medium in the electric signs which he may, with little labor or expense, attach to the sides of the truck body. Not only would the signs attract and hold attention when the truck is idle, but they would be carried far and near, spreading whatever gospel the owner might elect. The maintenance expense of such an outfit would be practically nil. In all probability it would be more than offset by the saving in gasolene and oil effected with the aid of the engine starter. So far but one manufacturer has taken advantage of the electric starter and lighter as a valuable advertising medium, as well as a real help in increasing vehicle efficiency, and it would seem that there is room for much thought along these lines on the part of the majority of manufacturers.

PUTTING MOTOR TRUCKS TO THE PROPER TRIAL.

While it is a long time since there has been room for genuine doubt as to the economic possibilities of the motor vehicle as a means for the transportation of merchandise, it is quite a rare thing to see motor cars placed in service in such numbers and under such conditions that exact knowledge as to the real extent of their capability is available—knowledge that is not made more or less uncertain by the necessity for allowing for certain conditions that may seem unavoidable.

Such an opportunity is afforded, however, in the case of the delivery service of the Ward Bread Co., whose plans were made and whose plant was laid out with a view to using a hundred motor delivery wagons and not a single horse. The result is just what might be expected. The cars, working under the best possible conditions, have shown that they are equal to giving nearly 99 per cent. of the theoretically possible service; that the cost of current, far from being a serious expense, is a comparatively insignificant item; and that the work of horses is made to appear almost absurd by comparison. In this case not only are the conditions surrounding the working of the vehicles almost ideal, but there is a total absence of what might be termed horse influence, and the system of records is such that all operating expenses are clearly accounted for and nothing is left to be guessed or imagined.

The Ward experience contains an obvious moral for those who hesitate between horses and motor vehicles, and finally decide to put a few motor vehicles in service with the horses and so obtain information as to the suitability of automobiles for the work. While this is all well and good in so far as it relates to the gathering of data on loads carried, road speeds, general handiness and so on, it is decidedly misleading in the matter of costs, for machines that work under conditions as unsuited to their requirements as are horse conditions, cannot be expected to do more than give an approximate idea of their full capabilities. The only trial that is of absolute and precise value is a trial under the special conditions demanded by motor vehicles.

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NATIONAL CHAMBER OF COMMERCE

Brought Into Being Under Auspices of President Taft—Its Officers and Scope —Organizations Eligible.

On Monday last, 22d inst., the Chamber of Commerce of the United States came into being under the direct auspices of the President of the United States himself, that being the title adopted for the organization which was brought about as a result of the call issued by Secretary Nagel, of the Department of Commerce and Labor, at the instance of the President. It was largely attended and was marked by unwonted animation.

The plan of organization proved a subject for long and spirited discussion. Some 600 delegates were present, representing various trade organizations, and practically every state in the Union, not to mention Porto Rico, Hawaii and the Philippines. Harry A. Wheeler, of Chicago, served as permanent chairman and had no easy time of it, so vigorous and insistent was the debate which followed the report of the organization committee, which report had been rendered after an all-night session.

Later, Wheeler was elected president of the Chamber, the other officers chosen being as follows: Vice-president for Pacific slope, J. N. Teal, Portland, Ore.; vice-president for South, Asa G. Candler, Atlanta, Ga.; vice-president for East, A. B. Farquhar, York, Pa.; treasurer, John Joy Edson, Washington, D. C., and counsel, J. Francis Burke, Pittsburgh, Pa.

In addition to the officers, the directors are as follows: George H. Whitcher, of New Hampshire; John H. Fahey, of Massachusetts; A. M. Cooper, of Connecticut; John P. Truesdell and Ludwig Nissen, of New York; A. J. Logan, of Pennsylvania; Bernard N. Baker, of Maryland; William D. Mullen, of Delaware; Francis F. Prentiss, of Ohio; Frederick Bode, of Illinois; Harry T. Wicks, of Michigan; August H. Vogel, of Wisconsin; C. G. Craddock, of Virginia; P. J. Kruesi, of Tennessee; Lewis W. Parker, of South Carolina; B. Thompson, of Louisiana; I. H. Kempner, of Texas; H. J. Hodge, of Kansas; Elias Michael, of Missouri; B. F. Kauffman, of Iowa; E. P. Wells, of Minnesota; Everett G. Griggs, of Washington State; A. C. Dickson, of Oregon, and Horace H. Allen, of California.

The general convention then adjourned. Later in the evening the directorate convened at dinner, Secretary Nagel attending for a while, to form its own organization.

The object of the Chamber of Commerce of the United States, as stated in the preamble, is "to affard a clearing house of business opinion and to secure united action upon questions affecting business interests."

Any local, state, interstate, or national organization, having not less than 50 members, organized for business welfare, but not for private gain, is eligible for membership. But national organizations which are combined of smaller organizations must count each one of these as a member, just as a local chamber of commerce or board of trade counts its individual members. In other words, anything like "pyramiding" is voided. Delegate representation in convention shall be on the basis of twenty-five members. The total may not be more than ten delegates, however.

One of the important articles adopted provides that the directors shall submit to the members of the Chamber of Commerce of the United States various questions on which the constituent members shall report back. This referendum is in accord with the suggestion of the President and Secretary Nagle that the new organization be formed so as to advise the government what is the general sense of organized business men of the country as to various questions.

A form of initiative is also provided. Constituent members may put questions up to the directors for reference, if the board approves, to all the members.

The board of directors consists of 25 members. Washington is designated as the permanent headquarters for the chamber, but it is provided that annual and special conventions may be held wherever the directors may designate.

Newark Also Stops Unnecessary Noise.

Following the example of Chicago, St. Louis and other cities, Newark, N. J., has enacted an ordinance, which, if enforced, will stop the horn-tooting nuisance. The Newark law requires that "every automobile shall be equipped with an adequate signal," which is defined as one producing an "abrupt note sufficiently loud to be heard under all conditions of traffic," and provides that it shall be sounded only when it is "necessary as a warning of danger." As the state law forbids the use of muffler cut-outs the residents of New Jersey are in a fair way of obtaining the reasonable peace and quiet which is their due.

Eight Months Lopped from Clark's Term.

George H. Clark, who was suspended for a term of two years for having participated in Barney Oldfields' "outlaw" meets in Los Angeles last year, and under an assummed name, will be in good standing again after the 1st of August. Clark's term would have expired April 1st, 1913, but the generosity which has distinguished the board of late was responsible for the shortening of his term of suspension by eight months.

Famous Car Returns to Actual Service.

By way of emphasizing its desire to assist owners of Thomas cars in maintaining their machines in an efficient condition, the E. R. Thomas Motor Co. has brought its New York to Paris racer out of retirement and started it on a tour of agencies, manned by Neil Nohr and Elmer Miller, two factory experts. Under the auspices of the Thomas service department the once famous machine will tour New York State and then New England, the first stop being Rochester, and its experienced crew will devote its time to helping agents and owners along the lines that are usually included in the term service.



April 27, Philadelphia, Pa.—Quaker City Motor Club's Roadability run from Philadelphia to Atlantic City

April 29-May 4, Burlington, Vt.—Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal.—Santa Monica road race.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

Minnesotans Form Another Club.

The Montevideo Automobile Club has been launched in the Minnesota city of that name, with these officers: President, J. E. Henry; vice-president, L. O. Norheim; secretary, C. A. Sherdahl; treasurer, G. A. Claggett.

Bolter Heads Michigan Organization.

L. M. Bolter has been elected president of the newly formed Itasca County (Mich.) Automobile Association. The other officers are: Vice-president, William Nesbett; secretary-treasurer, A. W. Sitz.

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ALABAMA STARS AT A MIXED MEET

Birmingham Dealers Combine Show and Racing—28 Car Exhibits, Two Slow Races and One Accident.

Sandwiched between several aeroplane and motorcycle events, and in connection with an exhibit of motor cars which were housed in the Exhibition Hall on the grounds, three automobile speed events were run under the auspices of the Birmingham (Ala.) Automobile Dealers' Association, April 18 and 19, on the State Fair track. A little overtime work on the part of Jupiter Pluvius rendered the one-mile dirt track so muddy that the races which originally were scheduled to be run early in the week, were postponed until Thursday, 18th, on which date a 15-mile event and a 10-mile event were run. The honors in each case went to F. Norman, who drove a Buick, his times being 17:16 and 11:25¾, respectively. A 15-mile event, which was run on the 19th, ended disastrously for Cecil Lyons, who jumped the track in his Chalmers car while completing the tenth lap, and created so much excitement that the race was called off. Lyons and his mechanician, Walter Cather, were removed to the hospital.

The exhibit of motor vehicles, conducted by a dozen dealers, embraced 28 different makes of automobiles, one of which, the Great Southern, is a local product. It is a four-cylinder car of more or less conventional design, and was exhibited in four different body styles by the Great Southern Motor Co. The other exhibitors were as follows: Highland Garage, Marmon, Buick, American, Oldsmobile, Regal and Broc electric; Brownell Auto Co., Ford; Birmingham Motor Co., Pierce-Arrow, Chalmers and Rauch & Lang electric; Drennan Co., Overland, Stevens-Duryea and Peerless; Matthews Auto Co., Krit and Firestone-Columbus; Studebaker Corporation, E-M-F and Flanders; Drennen Motor Car Co., Cadillac; Coxe Motor Sales Co., Marion, Apperson and Ohio; Charles Denegre, Packard and Hudson; Birmingham Garage, Thomas and Oakland; Birmingham Auto Co., Lozier and Hupmobile.

For a "National" Non-Stop Contest.

Having tabooed automobile racing as an unsafe sport, the Michigan State Agricultural Society, which conducts the annual fair in Detroit, has practically decided to undertake what aptly may be termed an automobile "merry-go-round." In other words, a national non-stop contest open to all. It is expected that application for A. A. A. sanction will be made during the present week and that the first contest will occur on the roads in and about Detroit during September next, with a view of breaking the record of 12,405 miles, which recently was set by a Warren car in California. The plans of the Michigan promoters are quite ambitious and include the offering of a number of prizes, chief of which will be a challenge trophy of such value that, it is hoped, it will become as famous as the Vanderbilt or Glidden trophies.

Lyon Becomes New York's Secretary.

Frank D. Lyon ,of Binghamton has been elected secretary of the New York State Automobile Association to fill the vacancy caused by the resignation of J. A. Ritchie, of Syracuse. Previously Lyon was deputy supervisor of the New York State Road Commission and a prominent figure in Republican political circles. He is considered one of the greatest experts on road construction in this country. The Empire State Motorist, the official organ of the State association, which was founded by J. A. Ritchie, has been sold to an association that will be incorporated and will be published by a separate company. A. J. Deere, president of the N. Y. S. A. A., is one of the principal backers of the enterprise.

Warren's Non-Stop Record Recognized.

The official acceptance by the Contest Board of the American Automobile Association of the non-stop engine record of 12,404.9 miles by a Warren-Detroit in Oakland lot, Februaray 4th to March 9th, was promulgated this week. The official report states that 748 gallons of gasolene, 48.25 gallons of lubricating oil and 41 gallons of water were used during the interval. It is also announced the records made on the 14th inst. by Louis Disbrow at San Jose for 15, 20 and 25-mile distances from a standing start have been officially accepted.

Denver To New York Tour Revived.

The Denver to New York automobile touring contest, which was undertaken and abandoned last year by the Denver Chamber of Commerce, has been revived, and it now is given out that it probably will be started on June 1st next. The Chamber of Commerce has interested a number of the more prominent dealers and several meetings have occurred at which, it is stated, at least ten entries have been pledged, with twenty others in prospect.

No Strings on New York's Reciprocity.

Despite reports to the contrary, which apparently had their origin in New Jersey, the state of New York will not interpose any barrier in the way of reciprocity between the two States. The Attorney-General of New York has handed down an opinion that New Jerseymen, whether owners or chauffeurs, will be free to enjoy the roads of New York for a period of 15 days in each year—the period fixed by New Jersey's law.

Chicago Truck Contest Declared "Off."

The Chicago Motor Club has abandoned the four-day truck contest which had been programmed to occur May 15 to 18 next. It may be held later in the year.

CONTEST RULES AGAIN REVISED

Numerous Changes of Far-Reaching Nature—New Definition of "Contest" and Provisions to Promote Safety.

After undergoing the refining test, as applied by the A. A. A. contest board and the Manufacturers' Contest Association, the A. A. A. contest rules, as formally promulgated this week by Chairman Schimpf of the A. A. A., disclosed not a few changes of far-reaching import.

The definition of "Contest" has been so modified as clearly to indicate what motor car events will be sanctioned by the A. A. A. and now reads as follows:

Contest—Any competition of two or more motor cars, governed by rules, in which entry fees may or may not be charged, or prizes may or may not be offered, or in which speed or durability are determining factors in evolving a winner.

The definition of "Automobile, Motor Car or Car" has been changed so as to include three-wheeled vehicles.

The minimum weights heretofore prescribed in stock chassis events have been eliminated and stock chassis contests will be governed by piston displacement, as are Class "C" events.

No car or chassis competing in events held under price or piston displacement classifications is eligible for any division except that to which its price or piston displacement entitles it.

Sanction fees remain unchanged, except that a fee of $1,000 is provided for events of 100 miles or more held on specially constructed speedways, such as the Indianapolis Motor Speedway, the Los Angeles Motordrome, etc.

To rule 17 which reads:

Reserved Territory—No sanction shall be granted to any promoters to hold a contest in the territory of an affiliated club, until the Contest Board has conferred with such club has been added:

Any objections which an affiliated club may file against the promotion of any contest in its territory must be supported by bona fide reasons for such objections."

The following new rule has been incorporated:

17A. No sanction shall be granted to any club, association or individual for any contest other than one to be promoted and conducted by it. Any misrepresentation or transfer of sanction to a second party for a consideration shall invalidate the sanction and render the club, association or individual liable to disqualification and ineligible for further sanctions.

Under new rule 33A, mechanicians must be carried in all road races, and in all events of 50 miles or more held on beach, speedway or track.

No driver or mechanician under 21 years of age will be permitted to participate in

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sanctioned events, and no person under 21 years will be appointed an official.

Registry cards will no longer be issued to drivers in reliability contests, but such drivers will be required to register with the referee of each reliability run prior to the start, on a form specially prepared. No regisgtration fee will be required and such registration applies only to that particular event.

To rule 110 on the "Change of Crew" of a car is added the following:

"Should the mechanician leave his seat for any reason whatsoever at any time during the race, the driver must not continue until the mechanician is again seated in the car. In case of disability or accident to the mechanician which may necessitate leaving the car, the driver may, after stopping and investigating, proceed alone to pits and make application to the referee for instructions."

The powers of the official referee of a contest have been somewhat enlarged by these two rules:

"He shall have the right to terminate a race before its scheduled finish, if emergency demands such action, and in such case no award shall be made."

"He shall have the right to temporarily stop or delay a race in case of impending disaster. Upon signal to stop, the cars must line up in front of their pits (or in the paddock) and during the time the race is discontinued they shall be in charge of members of the technical committee and no work of any kind shall be done upon them."

The deposit prescribed to accompany written protests filed with the referee, heretofore ten dollars in all cases except reliability tours, has been raised to twenty-five dollars for all events. It is hoped that a required deposit of this amount will result in a decrease in the number of frivolous protests.

The use of flags to signal contestants in track and road races has been made consistent. Heretofore the red flag in track races indicated "Stop" and in road races "Course is clear." The various flags and their use is shown:

Red flag—Course is clear.

Yellow flag—Blocked course; stop.

Green flag—You are entering your last lap.

White flag—Stop at pit on next lap for consultation.

Black and white checkered flag—You are finished.

Black flag with white center—A competitor is trying to overtake you. (Road judge's flag for use on narrow stretches of course.)

In stock car and stock chassis events the use of detachable or demountable wheels which do not involve the change of wheel bearings or that portion of the hub carrying the bearings is not permitted except such wheels are regularly supplied as stock equipment. In non-stock events such demountable wheels are permitted on same basis as the use of detachable or demountable rim equipment.

Considerable time and thought have been devoted to the matter of taking proper measures for the protection of spectators and competitors the following rules having been made for that purpose:

Rule 203. Fences—Fences should be of such a nature as not to endanger the lives of drivers and mechanicians of competing cars. The pole or top rail of fences at the inner and outer edges of the track on the curves must be removed, starting at a point where the curve begins and continuing to a point 25 feet beyond where the curve ends, measured in the direction in which races are run, i. e., with the left hand of the driver toward the inner fence.

Neutral Zones—Neutral zones must be established and maintained during the running of races. These zones should be 40 feet in width on the inner and outer curves opposite where the pole or top rail of the fences is removed, as required by the foregoing rule, and 30 feet in width on the straightaways.

Rule 204. Ditches, Holes or Obstacles—Ditches, holes or obstacles must not be permitted on the track between the inner and outer fences.

Rule 205. Anti-Dust—Adequate measures must be taken for the prevention of dust on the track. The use of water is not permitted, and dust must be laid by oils, calcium chloride or other similar preparations approved by the Contest Board.

Rule 206. Official sanction for track events is issued conditional upon a strict compliance with the above rules, and sanction shall be revoked in case of failure to meet each and every one of these requirements.

Handicap events will hereafter be timed from the start of the "limit" man or first competitor away from the line.

The number of starters in a track race shall be limited to one car for every 400 feet of track. This will permit 13 starters in a race held on a one-mile track and seven in a race held on a half-mile track. Starting positions shall be assigned in the order in which competing cars are presented to the starter, unless otherwise specifically arranged, and there shall be 4 feet between the hubs of contesting cars.

Touring events in which other than registered stock cars may be entered can be run under Class "E" of the general classifications and under the conditions of Grades III and IV. In case of tied scores, winners shall be decided by lot.

Reliability contests of Grades I and II shall be open only to registered stock cars, whereas contests of Grades III and IV may be (1) restricted to registered stock cars or (2) open to any car privately owned or otherwise, regardless of registration.

The revised rules in book form are now in the hands of the printer and will be ready for general circulation within the next week or two.

The revised rules for commercial vehicle demonstrations also are in hand and shortly will be made public.

IN SERVICE IN CALIFORNIA



KISSEL TRUCK ON MOUNT LICK



KISSEL HOTEL BUS AT STOCKTON

Who Is a Chauffeur in Minnesota?

"What is a chauffeur?" is a question which has bothered owners of automobiles—and also attorneys—in many States, and which just has been answered by the legal representative of the State of Minnesota. He has ruled that a chauffeur is any person who drives a car on public streets as the employe of another, whether his employment be occasional or incidental. The ruling resulted from complaints to the State examining board of arrests of persons driving cars without licenses who were not professional chauffeurs. Another ruling is that fire and police cars and drivers need not be registered.

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ELECTRICS IN BREAD BUSINESS

Their Advantages Over Horses Proven by Facts and Figures—Ward's Address to Electric Vehicle Association.

It is quite a common occurrence for a concern contemplating the extensive use of electric commercial vehicles to make a preliminary test with a few machines, and, basing their cost estimates on the information gained through their use, decide that the cost of current for charging the batteries is likely to be exceedingly high. That such is by no means the case is conclusively shown in a paper read by Charles A. Ward before the Electric Vehicle Association of America at its monthly meeting on Wednesday last, April 23d. In this paper, which is entitled "The Electric Vehicle Installation of the Ward Bread Co.," it is shown that the cost of electricity for charging the batteries of the 100 machines comprising the fleet is the smallest single item of expense connected with their operation, and that the cost of current could be doubled without becoming a particularly serious matter. Furthermore, the figures quoted in the paper, which are taken from the working records of the machines, indicate that the service efficiency of the cars —that is, the service actually given in proportion to the possible service—was 98.83 per cent.

The Ward Bread Company operates two plants in Greater New York, one in Brooklyn and the other in the Bronx, but the paper dealt only with the Bronx plant. After referring to the early experiments of the Ward company in its efforts to obtain data for use in building up a delivery service on a large scale, Ward briefly describes the cars used, which are enclosed battery wagons of half a ton capacity each, with sliding doors back of the driver's seat to give access to the interior, and with single motor drive, built by the Ward Motor Vehicle Co., and then describes the garage. In reality this is the shipping department—a somewhat startling combination, and one that is made possible only by the extreme cleanliness of electric motor vehicles. The central part of the ground floor of the plant is a glass enclosed square surrounded by loading platforms, outside of which is the open space in which the vehicles stand. The bread is delivered to the central enclosure and thence transferred to the wagons, which back up to the platforms for the purpose of loading.

When placed for loading the vehicles are packed side by side so closely that they stand almost hub to hub, concentrating to a minimum the area which must be covered in loading. Separated from the main room of the garage are the battery, repair and charging rooms, so that there is no possibility of gases or odors coming in contact with the bread. For charging, direct current at 110 volts is used; this voltage is sufficient for the lead batteries used in 85 of the cars, but for the 15 which are equipped with 72-cell Edison batteries additional voltage is obtained by the use of a 35-volt booster set. All vehicles are charged while standing backed up to the loading platform; each machine is numbered and it has its own place at the platform, and from under the platform there extends a charging cable and plug, for each car, correspondingly numbered. The switches on the charging board are numbered also, so that the making of current consumption records is much simplified.

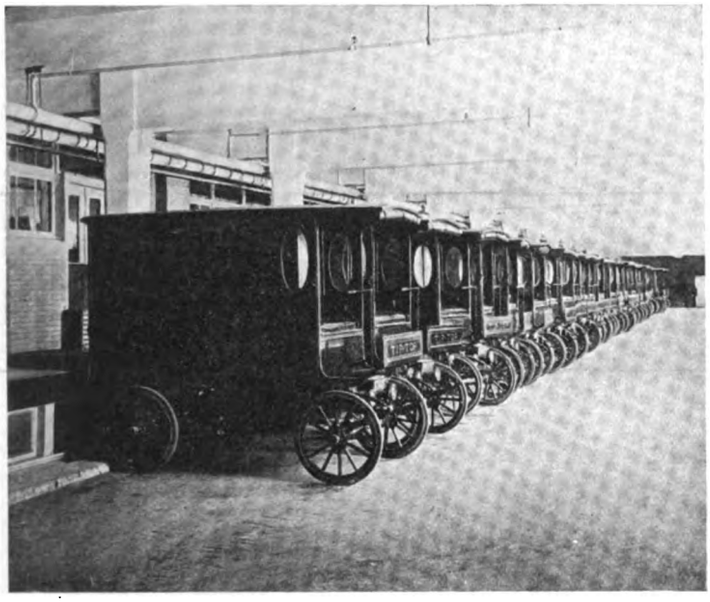
A complete, and yet simple, system of records is maintained, and is described as follows:

"Three sets of records are kept, namely, a daily vehicle report card, a five-weeks' report card and a parts renewal card.

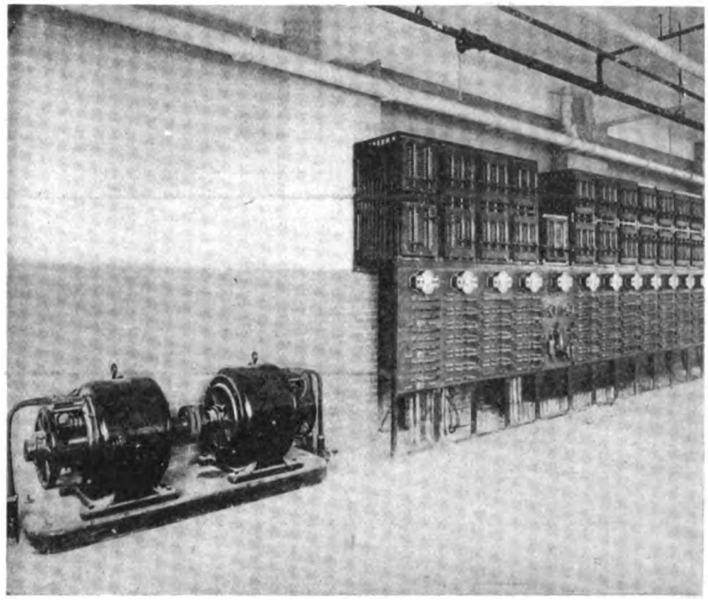
"The vehicle report card is used daily by each vehicle operator. A clean record card, to be found in a pocket in the front of the vehicle, is a notification to the operator that his car has been properly inspected, repaired, washed and charged, and as such is ready for his use. Should no card be found he is to make immediate inquiry of the garage superintendent for correct information. Should his car have to remain in the garage, a substitute is given him for his use that day or until his regular car has been repaired.

"The record above referred to is kept by the operator until he is through for the day. It then bears his name, vehicle number and information as to the number of trips made, total mileage and operator's report as to the condition of the vehicle when turned in. Accidents must also be reported on this card. Completed, the card is then turned over to the garage superintendent, who despatches inspectors and repair men, who make any slight repairs necessary, oil the vehicle and turn it over to the washing department. This completed, the vehicle is turned over to the charging department, where it is then charged and made ready for duty the following morning. Records are made on this card of all repair parts and the time required to install the same. Records are also made of volts, amperes, hours and time required to charge the battery.

"It can then be seen that the totalized costs on the record card represent all operating costs for the day. I should have added that these cards also bear an additional expense item representing the total sum of all other garage expenses, including superintendent's time, labor of all kind, acid, water, tools, sponges, chamois, soap, oil, grease and all other items incidental



VEHICLES AT LOADING PLATFORM



SWITCHBOARD AND GENERATOR

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to the proper care of the vehicles in question. Every expense is put upon these cards except the items of depreciation and interest on investment. The costs shown later, then, will include for the period given every other expense save the two last-named items.

"From the vehicle report card we pass to the 'Five Weeks' Report' card. Each of these reports covers information for a period of five weeks on one vehicle. Such information as the following is entered: Date, condition of vehicle, battery number, miles per day, power cost, accident cost, repair cost, total cost, route number and any additional remarks. For the sake of simplicity, all costs except the cost of current are included under the heading of repair cost.

"The last record card is a renewal of parts sheet which embodies the vehicle specifications, factory number, date put in service and the dates on which tires, bearings, batteries and other wearing parts were replaced. This gives a line on the length of life of the various parts and acts as a check on not only operator and garage, but the makers of parts and factory as well.

"No attempt has been made to go further into detail than outlined above, as the information collected is believed to cover practically every item to be desired.

"In coming to the costs proper, I would like to say that no preference was given looking toward the selection of what might be termed a good period. As might be surmised from the five-week report cards previously referred to, the Ward Bread Company close their books every five weeks. Hence the costs following cover the entire operating expense, except interest and depreciation, on the entire fleet of one hundred vehicles. The last period available for use in this paper began January 29, 1912, and closed on March 2, 1912, and so far as weather conditions are concerned was surely not a favorable one.

"The five weeks' cost report on vehicle No. 328 shows that this vehicle ran thirty working days (five weeks), an average of twenty-five miles daily, at a total cost, except interest and depreciation, of $19.57. This vehicle had the banner record for this five weeks' period; had no acident cost and practically no repairs.

"So that you may see the worst side as well, I will show the record covering the worst vehicle of the group. This was vehicle No. 163. It ran thirty days (five weeks), doing twenty-eight miles daily at a total cost of $64.21. A new tire, its battery washed and some repairs account for the high cost.

"As it is impossible to show each of the one hundred record cards for this period, I shall have to ask you to accept a summary of all the figures.

"These records show that during the period a total of sixty-six thousand and twenty-three miles were traveled, or an average mileage per car of twenty-two miles per day.

"The total power cost was $597.63, or $.199 per day per car; an average cost per mile of $.009.

"The total accident expense was $84.65, or $.0182 per car per day. Per mile this figures $.00083.

"The total repair cost, which cost, as previously stated, covers all items of expense in connection with the garage and the maintenance of the vehicles, was $2,400.50, or an average of $.80 per day per car. Per mile this figures $.0363.

"To summarize the above we have the total of these figures, or $3,082.78 as the entire cost for thirty days (five weeks) of operating the entire fleet of one hundred electric vehicles exclusive of interest and depreciation.

"Per day the cost was $102.73, or per vehicle per day, $1.027. Per mile the figure is $.0466.

"One thing should also be noted, namely, the small comparative cost of the current to run these cars. In other words, this item, commonly so much discussed and complained about, is the smallest item of expense. Indeed, it could be doubled and only affect the total operating cost by 20 per cent.; surely nothing to be greatly alarmed over.

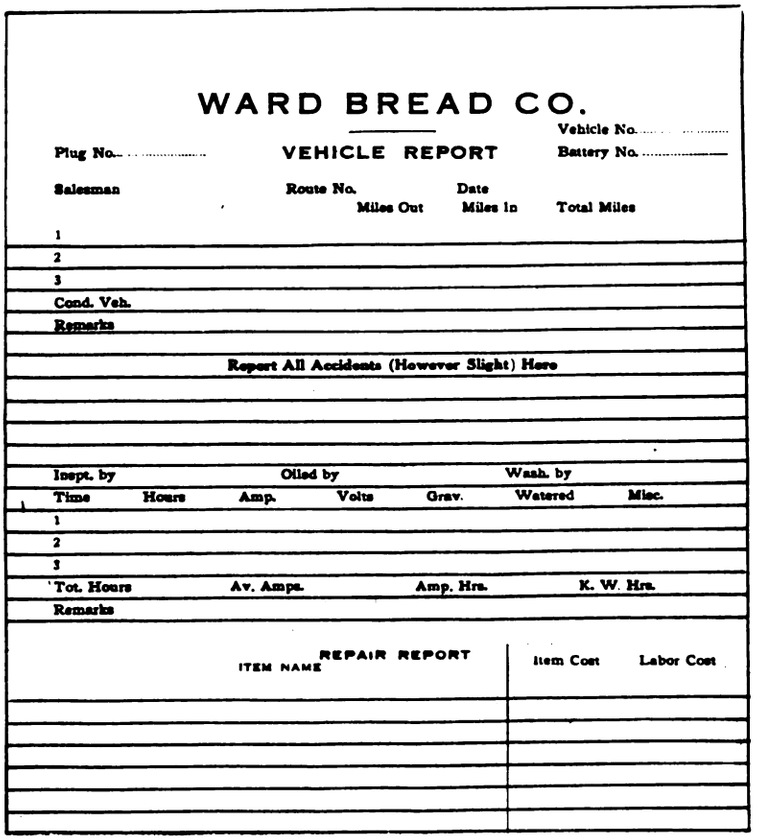
"Before closing I should like to say that during the period above referred to twenty batteries were washed, a number of sprockets and chains were renewed, as were also a number of tires.

"An inspection of the records shows that, during the period, the shortest route was twelve miles and the longest forty-one miles. During the summer and fall the longest route was made by what was called a three-tripper and which ran on one charge sixty-three miles. This was not a regular route.

"The longest regular route was one to Port Chester and was a little over fifty miles daily. This vehicle ran until some time in December, when a gas car was put on for the winter service.

"Another interesting fact obtained from the records cited was what might be called the efficiency of the service. This was determined by dividing the total number of car days operated by the maximum possible car days (100 X 30 or 3,000). This efficiency proved to be 98.83 per cent; certainly little to be desired in the way of reliability of service; especially when one considers the fact that the results are for a winter period. The system above referred to is being changed from time to time, as experience shows to be advisable. Experiments are being made almost continually looking toward the controlling of operating conditions that will better even the foregoing records.

"That the end is not yet, it is safe to assume; an example of this is clearly shown by the low costs due to accidents. This figure, you will recall, was but $84.65 for the entire fleet over the entire five weeks' period. Let us hope that other means may be found whereby the remaining costs will be lowered as well. When this has been attained, the millennium of the electric vehicle will have arrived."



WARD BREAD CO.

Vehicle No.

Plug No. VEHICLE REPORT Battery No.

Salesman Route No. Date

Miles Out Miles In Total Miles

1

2

3

Cond. Veh.

Remarks

Report All Accidents (However Slight) Here

Inspt. by Oiled by Wash. by

Time	Hours	Amp.	Volts	Grav.	Watered	Misc.
1						
2						
3						

Tot. Hours Av. Amps. Amp. Hrs. K. W. Hrs.

Remarks

REPAIR REPORT

ITEM NAME	Item Cost	Labor Cost

HOW COMPREHENSIVE RECORDS OF PERFORMANCE ARE KEPT

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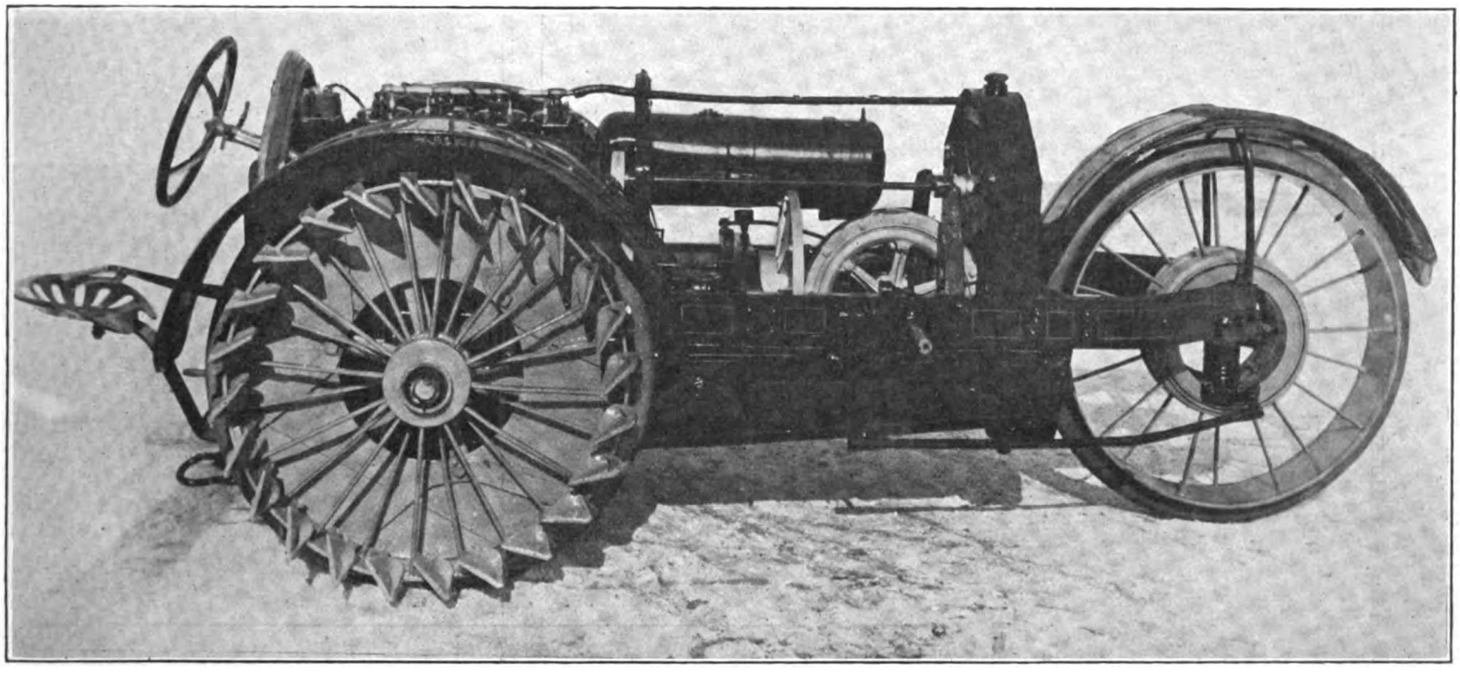
LAMBERT BRINGS OUT TRACTOR

Machine That May Be Used on Roads and Fields—Three Wheels and Friction Drive Its Features.

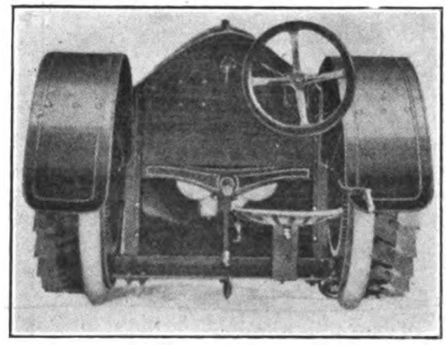
If there is one type of machine which more than any other requires many changes of speed or "gear" ratio, it is the farm tractor, which necessarily must move slowly and with great power when dragging plows, but is not held down to such low speeds by extraneous conditions when on the hard road. This doubtless was one of the considerations that influenced the Buckeye Mfg. Co., of Anderson, Ind., in applying the friction drive principle embodied in the Lambert car to the Lambert agricultural tractor—in England they probably would call it an "agrimotor"—designated an orchard tractor, which is shown in the accompanying illustrations.

While the first requisite, high tractive capacity, is obtained by the use of a 40-horsepower motor driving through friction disks, there are other requisites which are of almost equal importance. A machine for use in orchards must be extremely low, and the Lambert tractor, through underhanging and general compactness and by the low placing of the driver's seat in the extreme rear, has been kept down to a height of 42 inches. It must be capable of making very short turns, and this is permitted by the use of a single steering wheel in the front and the shortness of the wheelbase. And when on hard roads the rear wheel cleats, which are essential to traction in soft ground, are kept out of contact with the road surface by solid rubber tires which form the tread for road work, permitting fair speed without damage to the road surface. A maximum speed of ten miles an hour can be attained.

The motor and change-speed mechanism, essentially the same as used in the Lambert car, and including a 40-horsepower four-cylinder motor and the Lambert gear with one driving and one driven disc, are placed in the tractor in a position which is the reverse of that of the motor and drive in the pleasure cars—that is, the motor is in the rear and drives forward to the discs, which in turn drive backward to the tractor wheels. This brings the weight of the motor almost directly over the rear wheels, where the weight is needed. All the mechanism is covered by two hoods, one over the engine and the other over the change speed mechanism, the front being formed, as usual, by the radiator. The driver occupies an iron seat of the skeleton type common to agricultural machines, and steers with a regular automobile hand wheel. The single steering wheel in front is mounted on a very large hub which, as the illustration shows, is essentially two rings, the outer one carrying the inner ends of the spokes and forming part of the wheel and the inner ring remaining stationary, so far as rotation is concerned. Within the inner ring is the pivot upon which the wheel turns in steering, the pivot crossing the ring diametrically and vertically. Between the inner and outer rings there are presumably antifriction bearings, with either balls or rollers. The rim of the front wheel is a broad steel band with the rubber tire in the middle; enough of the band projects on each side of the tire to form a support when the tire sinks in soft ground. Very heavy steel wire is used for the spokes.



LAMBERT THREE-WHEEL ORCHARD TRACTOR WHICH EMPLOYS FRICTION TRANSMISSION



LAMBERT TRACTOR, REAR VIEW

No little ingenuity is displayed in the construction of the rear wheels, which, of course, are depended upon to carry practically all the weight and at the same time transmit power. The tread may be said to be triple. One the inside, next to the frame, is a solid rubber tire which is of somewhat greater diameter than the rest of the wheel, so that it carries the weight when the ground is hard. Next to this is a flat steel band similar to that on the front wheel, but with projecting cleats, or, properly speaking, plates, which dig into soft ground and resist the tendency of the wheel to slip. Outside of this there is a ring of plates which are continuations of the plates on the steel rim and, of course, work in the same way, giving any additional traction when needed. The cleats, or plates, clear themselves of soft earth automatically. Strong steel spokes are employed on the outside, while the inner side consists of a broad steel ring with very short spokes at the center. All three wheels are covered by very wide mudguards.

The usefulness of the Lambert tractor does not end with its ability to drag plows

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or wagons, for it is designed also to drive farm machinery, one of the disk shafts projecting through the frame near the front of the hood and taking a belt pulley which forms part of the equipment of the machine. The shaft can be seen quite plainly in the illustration. This arrangement increases the field of usefulness of the machine very considerably, as it can be kept in service driving saws, feed-cutters, threshing machines and the like.

Keeping Open the Breather Tube.

The importance of keeping the opening of the breather tube, free and clear from obstruction cannot be emphasized too greatly, especially with two and six-cylinder motors. With the four-cylinder motor, if the crank case is hermetically sealed, there is practically no compression in the case, because while two pistons are traveling upward the other two are on the downward path and the compression of the air by the latter is exactly balanced by the rare faction by the former. With a two-cylinder motor, however, both pistons are traveling either up or down at the same instant and the compressed air is liable to blow the lubricant out of the main bearings and the bearings of the cam shaft and a hot bearing will result. The same is true with a six-cylinder motor, wherein the cranks are set at angles of 120 degrees.

Wiring That May Increase Efficiency.

Occasionally it happens that the speed and efficiency of an electric vehicle, either commercial or pleasure, can be slightly increased by removing the wiring and replacing it with wire of a larger size. This is more apt to be true of old machines than of those of recent origin, which usually are well wired. The way to find out if an improvement can be made is to go over the wiring immediately after the machine has been doing hard work for a considerable time. If the wire is too light it will be more or less heated. If no heat is noticed it is safe to assume that the wiring is of ample capacity.

Tires That Require Equal Air Pressure.

The equipment of either pleasure cars or trucks with dual pneumatic tires necessitates that even greater care than is usual be taken to see that the proper pressure of air is maintained in them. If duel tires replace single tires the pressure may be mainted slightly lower, for each tire will be subjected to less strain. In any case, however, great care should be taken to insure that the pressure in both tires of a dual set is maintained exactly the same. If it is not, one tire will support more than its share of the load and rapid depreciation may be expected.

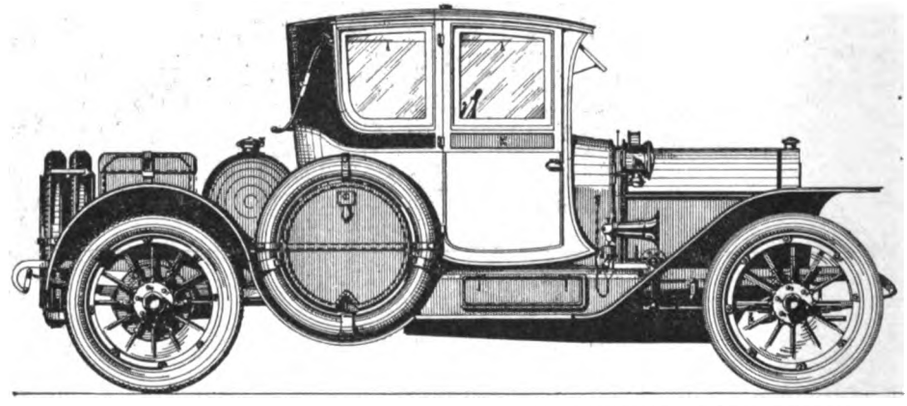
Closing Oil Holes Before Painting.

Before having the car painted cotton should be stuffed in all of the oil holes, which serve to conduct lubricant to the spring shackles, etc.

COLUMBIA ADDS COUPE-LANDAULET

It is Mounted on Knight-Engined Chassis and Has Unusual Equipment—Running Water a Feature.

In adopting as a stock body style the combination coupe-landaulet which for some time past has been much in vogue abroad, though up to quite recently it was more or less of a curiosity on American shores, the United States Motor Co. has not been content to accept existing designs in their entirety, but with characteristic progressiveness has developed a type of body of this class that is different in many ways and which is eminently suited for long-distance touring. In the main, the new body is a coupe-landaulet, though in modifying existing designs the manufacturers have incorporated a number of features that bid fair to make the body more than ordinarily popular. In fact, two of the cars already have been sold to San Francisco physicians, orders for immediate delivery having been telegraphed to New York.



COLUMBIA-KNIGHT COUPE-LANDAULET—AN UNUSUAL BODY DESIGN

Though the new car is a distinct novelty and is somewhat fantastic as regards the body design and equipment, it is practical withal, and is calculated to permit the driver to tour extensively in defiance of the elements. For fair weather it is a simple operation to let down the back, and for foul weather the occupants may be, as Franklin said, "as snug as a bug in a rug" with the back raised. The joints between the rigid portion of the body and the back are cunningly hidden and are so constructed that it is a physical impossibility for either water or dust to enter. Provision for seating two passengers side by side is made, and a third may be accommodated in emergencies on a swinging seat facing the driver's companion.

As regards the equipment, it is more complete than is usual, as becomes a car that is to be used all the time over all kinds of roads and under all kinds of conditions. The gasolene capacity, for instance, is 60 gallons, and no less than six spare tires are carried, two of them being in racks behind the gasolene tank and trunk and two in cases on each running board. Spare tubes and tools are carried in a compartment in the trunk and additional storage space is provided in the spare tire cases. One of the unique features of the car is that there is a fresh water tank built into the roof and pipes leading to a faucet inside the body. The water is to be used for ablutions or for drinking or for replenishing the radiator on long runs.

The body is mounted on a stock model Columbia-Knight chassis of 129 inches wheelbase, and in addition to the features that have been mentioned is equipped with the accessories as listed for the other Columbia-Knight cars that are catalogued. The bore and stroke of the motor are 4⅞ inches and 5⅛ inches, respectively, and the rated horsepower is 38. Other excellent features of the chassis are the large cone clutch, the selectively operated four-speed change gear mechanism, with direct drive on fourth speed, and the full-floating rear axles.

"Trick" in Towing Electric Vehicles.

One of the things that occasionally will occur where electric motor vehicles are used is the exhaustion of batteries while on the road. In such a case it often is necessary for another battery machine to go one and tow the "dead" machine home. And it sometimes will happen that the only machine available for the rescue will be one so small that there may be doubt of its ability to get through the job without burning out a motor. If the work must be done by the little car, the best way usually is to disconnect the battery leads from its motor and by means of long wires connect them to the motor leads of the big machine, cutting out the "dead" battery first. Then the big car can be run on the battery of the little one, which is towed. The brunt of the work is borne by the battery, but if the pull is not a long one it is not likely that the overload will do any permanent harm. This measure is, of course, only for emergency use, but has been made use of with good results in several instances.

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IS THE ACCELERATOR TOO MUCH OF A GOOD THING?

The Pedal-Operated Throttle Lever as a Promoter of Accidents and the Steps Which Might be Taken to Render it a Safer Convenience—Accessibility That Encourages its Continual Use and Frequent Abuse—Results That may be Expected to Follow.

One day last week a young man of wealth and social prominence was sentenced for manslaughter to an indeterminate sentence of from five to ten years imprisonment in a New Jersey penitentiary. He was charged with reckless driving and his crime consisted of running over and killing a pedestrian and then running away. His chief defense was that in the excitement of the moment in attempting to avoid the pedestrian his foot accidentally came in contact with the accelerator instead of the brake pedal, and though the circumstances surrounding this particular instance would seem to warrant the jury's verdict, it is but one case of many wherein the accelerator has been forced to shoulder the blame and it serves to indicate more forcibly than ever that after all there may be more in the excuse than at first appears on the surface.

This case and others like it suggest that perhaps the accelerator is made too accessible—that it might be better to make it harder to get at, for as originally intended it was merely an auxiliary and not the main throttle controller, in which capacity it still serves its best purpose. As for the origin of the device, it is not difficult to trace either its inception or its steady rise to popularity.

Years ago, when the automobile industry might be said to have donned its swaddling clothes, let alone doffed them, certain daring spirits, following the instinct which is strong in most human breasts to excel—to go further and faster than anyone else—embarked in the hazardous business of automobile racing. And then, as now, the handling of fast-moving vehicles which depend for their direction of motion upon the continuous exertions of their drivers, was not, and is not, child's play. It was, and still is, a strong man's job. Which means that both hands must be on the steering wheel at all times. Consequently as both hands were employed in the very necessary occupation of steering the vehicle some other means of operating the mechanism that controlled the speed of the car had perforce to be evolved.

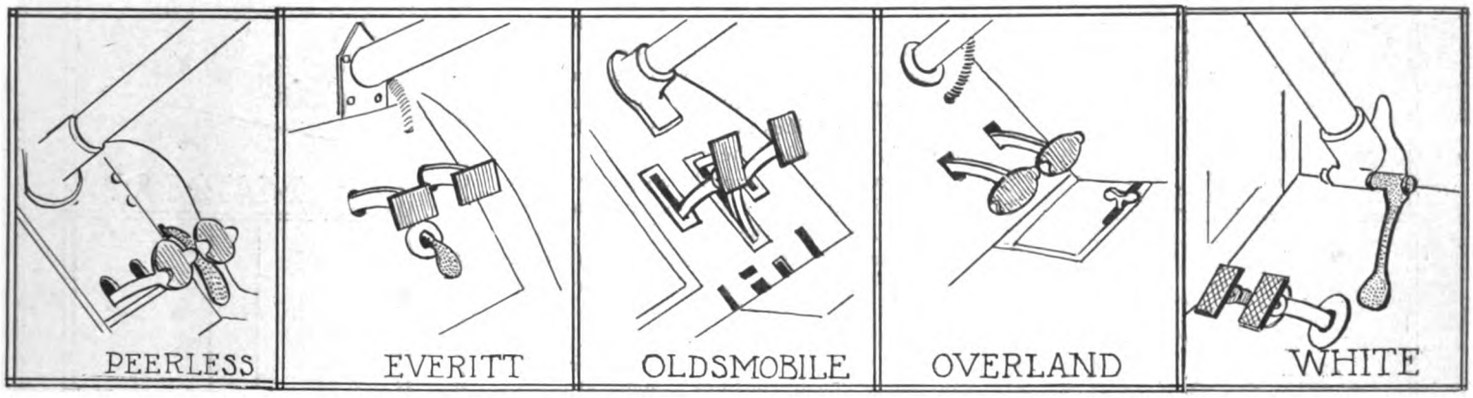
The answer is to be found in the pedal-operated throttle, or the accelerator, as it generally is styled. From an insignificant beginning on one or two racing cars, the popularity of the accelerator steadily has increased until at present the number of manufacturers who do not equip their products with the device almost might be counted on the fingers of one hand, or on two hands at least. When the accelerator first put in an appearance it was viewed skeptically, but today the car that is without an accelerator is the exception and not the rule.

When the automobile industry commenced to don the habiliments of full-fledged growth, to enlarge the metaphor, accessibility became a fetish, which is as it should be. It is comparatively easy to trace engineering progress in the efforts or manufacturers to render their products simpler and more easily handled. Clutch and brake pedals, however, have remained substantially in their original positions and otherwise have altered but little. But from an accessory, an auxiliary to the operation of the car, the accelerator gradually has assumed to a position of very much greater responsibility; from being tucked away, out of the way, where its use was discouraged, it has come to be placed right out in the open. Its continual use is encouraged by placing it in the most convenient and most accessible position, where the driver's foot most naturally rests.

Of course every attempt to increase accessibility or to simplify the operation of a vehicle is laudable—provided the ends attained are positive and not negative, no matter how they are viewed. But it is an open question whether making the accelerator as accessible as it has been made can be viewed in the light of a positive advance, or, to put it in even simpler language, as a real advantage. It has been demonstrated not once, but many times, that its present accessible position may lay the driver open to accident that would not have been so likely, at least, if the accelerator had been absent, or if it had been less accessible and consequently less likely to be depressed accidentally.

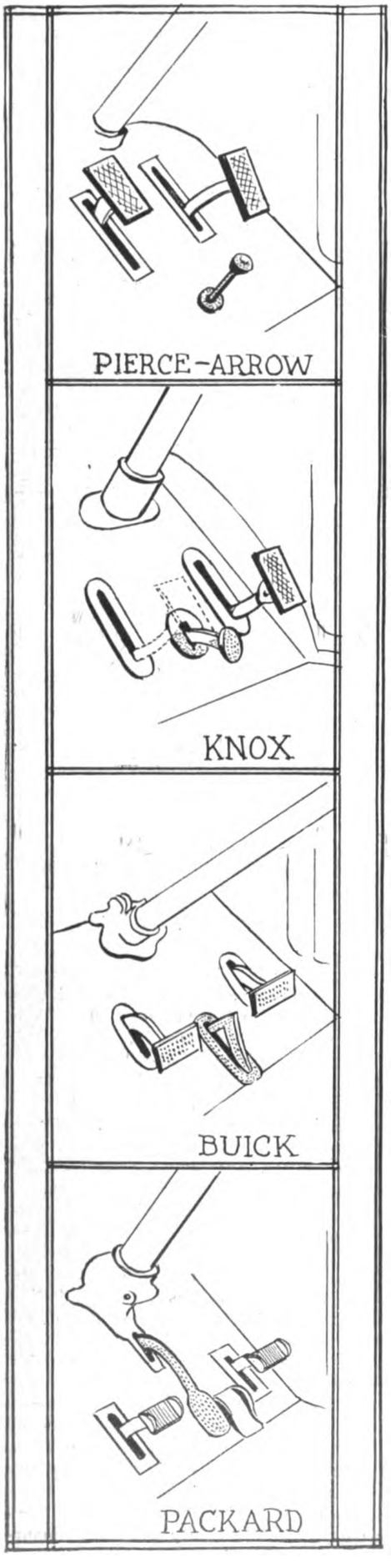
There are many reasons why the accelerator should be less accessible, so that its continual and general use may be discouraged. It is probable that a canvass of the better known manufacturers as to the status of the accelerator would reveal the fact that it does not occupy a very prominent place in the affections of automobile engineers, for there are few devices which may be so easily used in a manner that works damage on the motor and the rest of the car as well. As just one indication that this is so the case of one of the biggest manufacturers might be cited. Up to a little over a year ago this manufacturer would not equip his products with an accelerator for this very reason: It conduced to engine abuse. Popular demand made the fitting of an accelerator necessary, but that does not say that the manufacturer approves of the device.

To go to the other extreme, it is perfectly true that there is any number of manu-



WHERE ACCELERATORS ARE POSITIONED ON FIVE PROMINENT AMERICAN CARS

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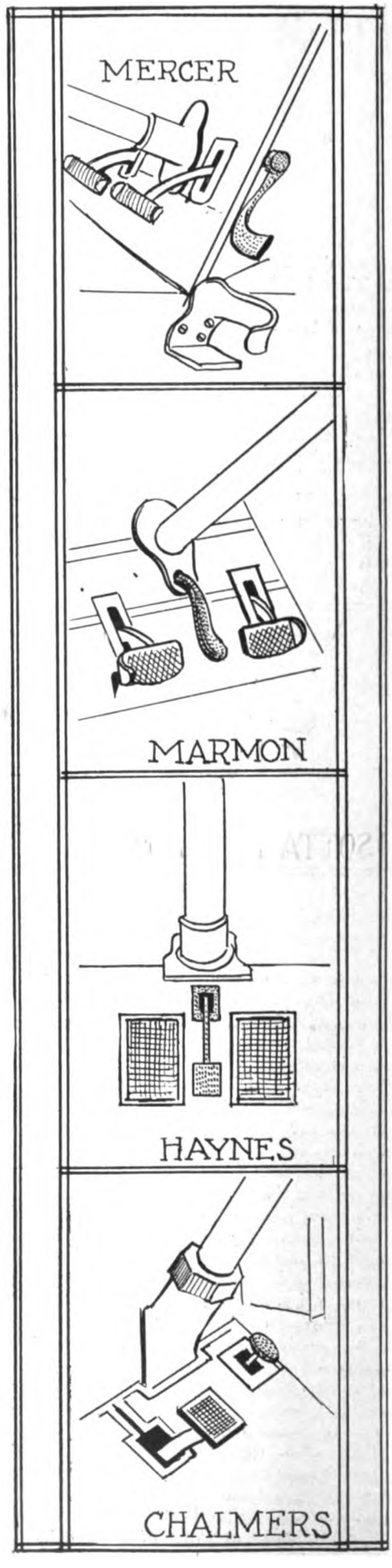


facturers who do not equip their products with hand-operated throttles, but rely entirely upon an accelerator; for instance, the fleet of taxicabs that ply for hire in New York City. But that is no criterion, for, as everyone knows, taxicab drivers are noted for their collision-proclivities, and who is to say whether the position of the accelerator, which must be accessible when it is used at all times, is not responsible for some of the accidents at least?

In any discussion of the relative merits and demerits of the accelerator as a desirable adjunct it becomes apparent that it has one undeniable advantage, to wit: When it is necessary to apply the brake, the operator's foot must be lifted off the accelerator, which automatically closes the throttle and chokes down the engine speed. Of course, leaving mechanical considerations aside, it makes little difference whether the engine speed is reduced or not as long as the clutch is disengaged. But if the operator should neglect to disengage the clutch the car would be stopped more quickly if the engine speed was low than it would if the engine were running faster.

Apart from its influence on the accident column, if the accelerator could be dispensed with or something done to lessen its use, it probably would be found running costs would take a tumble and the wear and tear on engines and cars would be considerably reduced. The reason is thus: No road is absolutely smooth, and every time the car jounces over an obstruction there is a tendency for the foot of the operator to descend slightly and open the throttle a little. If the spring which returns the pedal is light then the spasmodic running of the engine under the alterations of the throttle opening may be very noticeable. Obviously such jerking, such alternate opening and closing of the throttle, when to all intents and purposes it should be maintained set at a certain mean opening, causes excessive gasolene consumption and increased wear and tear on the engine and the car. When the throttle is open for a moment and then closed again an increased amount of mixture is drawn into the cylinders and is burned. But the weight of the car is such that the momentarily increased power is not sufficient to increase the car speed. Consequently, the gasolene is wasted and an extra strain is put on the engine. Incidentally the strain is out of all proportion to that which is sustained when the car speed is accelerated under normal conditions, for then the throttle would be opened slowly a little at a time.

It has been suggested that the spring on the accelerator pedal be so adjusted that the weight of the operator's foot is just balanced, but this is bad practice—even though it does mitigate the alternate opening and closing trouble—for the reason that it encourages the continual use of the accelerator Even with such a spring the operator's foot is bound occasionally to depress the pedal unintentionally and the trouble is not entirely removed. If the



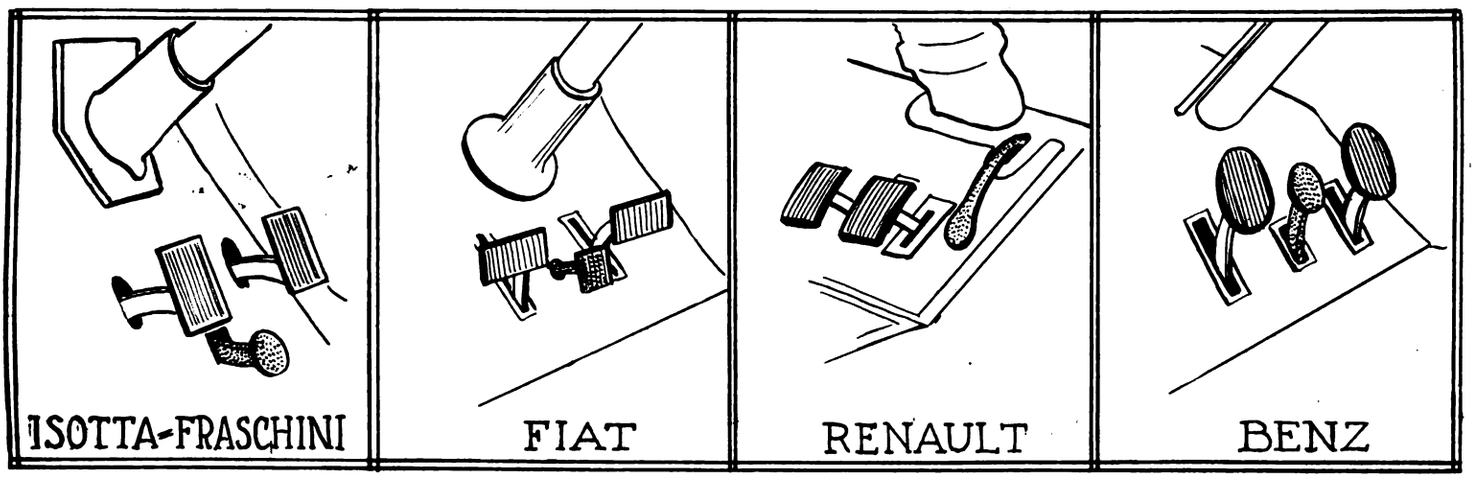
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spring is made still heavier considerable effort is required to maintain the pedal in the proper position, and while this may become uncomfortable after a time it is a better alternative than making the spring either too light or of just such tension that the weight of the operator's foot is balanced, for it discourages the use of the accelerator

There is another abuse which the accelerator augments, namely, the racing of the motor with the cut-out open in order to warn pedestrians and the drivers of other vehicles. It is such a simple matter to release the clutch and depress the accelerator that the practice grows apace to the detriment of machinery and the joy of the garageman who supplies the gasolene and oil. Perhaps it is just as simple to race the engine with the aid of the hand-operated throttle, but there is not the temptation, and besides the action that is necessary is not really is a valuable aid to operation, provided it is properly used—used as it was originally intended and as it now should be intended to be used—as an auxiliary device and not as the main throttle control.

But to get back to the question of accessibility; it stands to reason that the better the driver and the more experienced he is the quicker and the harder he will jam his foot down in the region of the brake pedal in an emergency. If the brake pedal is under his foot when it comes down all is well and good, but if, perchance, the accelerator, instead of the brake pedal, be in the line of action, then is disaster invited, for an emergency stop generally means that the cause is distant scarcely more than a car's length or two, and whereas instant application of the brakes would avert the collision acceleration of the engine instead is very nearly certain to result in damage to something or some one. As a matter of the accelerator be either between the pedals or else at the right of the brake pedal, if the clutch pedal is at the left. The manufacturers of English Daimler cars fit a small auxiliary pedal at the left of the clutch pedal, but it is not an accelerator, in the sense that the word generally is used. It is merely for opening an auxiliary air valve in the carburetter and is for use only when the car is being driven at speed in order to reduce gasolene consumption. It is operated by the left foot, but its position is such that it is impossible to use it except when the clutch is engaged. In other words, it cannot be used as an accelerator, pure and simple.

It would appear that locating the accelerator pedal to the right of the brake pedal in the usual arrangement is better than placing it between that pedal and the clutch pedal for the reason that it may be placed further away and be less liable to accidental



FOREIGN PRACTICE IN DESIGN AND POSITIONING OF ACCELERATORS

so automatic—it requires greater premeditation.

In gear changing, the pedal-operated throttle may be either an advantage or a disadvantage according to whether a change to a higher or a lower gear is made and the skill of the operator. But regardless of the experience of the operator, the accelerator should prove an advantage when changing "up" for then the engine speed automatically is reduced when the pressure on the pedal is released. But when a change to a lower gear is made the accelerator may prove a disadvantage, for then, according to all the tenets, the engine speed should be increased instead of decreased. However, even in this case an accelerator may be an advantage if it is properly used, for it affords an easy method of increasing the engine speed temporarily with the gears in neutral and the clutch engaged and the operator's free hand on the gear shift lever for a quick change.

The principal advantage of the accelerator, of course, is that it leaves both the driver's hands free to operate the steering wheel, the gear shift and emergency brake levers and the signaling device. From which it may be deduced that the accelerator cold fact, so very many drivers keep a foot on the accelerator at all times, that in that fractional part of a second when danger threatens, the instinctive movement to "brace" oneself for the expected shock rarely fails to take the form of downward thrust of the legs and there is small doubt that it is the resulting unconscious pressure on the accelerator that has meant the difference betwen life and death in more instances than the world ever will know.

Therefore if the accelerator were hard to get at, if it were in a position less accessible where it would require conscious effort for the driver to keep his foot on it, there would be less likelihood of accidents of the kind. In the majority of cases, as may be seen by the accompanying sketches, the accelerator is placed centrally between the clutch and brake pedals, the purpose being to eliminate the necessity for very extensive movement in shifting the foot from the brake pedal to the accelerator, or from the accelerator, where the foot usually rests, to the brake pedals. For obvious reasons the accelerator always is operated by the foot that operates the brakes. Sometimes it is the left foot, but generally it is the right. Consequently it is necessary that pressure. Quite a number of manufacturers have embraced this arrangement, viz., White, Mercer, Chalmers and several others. Some of them place the accelerator quite a distance from the brake pedal and others locate it where it is possible to depress both the brake pedal and the accelerator at the same time by merely sliding the foot half off the brake pedal. In Pierce-Arrow cars, however, though the accelerator is placed between the pedals, the likelihood of its being pressed accidentally is reduced by the simple expedient of placing it several inches nearer the seat riser than is usual. In this way, also, its use is discouraged to a certain extent, for it is high enough to cause slight discomfort if it is used for extended periods.

But even when the accelerator is so far from the brake pedal that it is impossible to operate both at the same time, with the same foot, the fact remains that the operation of the device merely requires a straight downward push. Whether the operator's "foot slips," or he makes a mistake, or it is merely an instinctive bracing makes no difference to the operation of the accelerator. And though it may be held that no experienced driver would put on the brakes

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without first releasing the clutch, in which case it would make no difference whether the accelerator pedal were depressed or not there is no telling what anyone may do under stress of excitement and there is always the chance that the wrong thing may be done.

Without doubt, the most obvious way out of the difficulty is to eliminate the accelerator, but there are so many persons who use the device continually and have become accustomed to it that it is a question whether that course would be approved The accelerator is not an absolute necessity as far as that goes, and it could be dispensed with. As a matter of fact there is any number of drivers who never use an accelerator; they have no trouble getting along without it and they don't take anybody's dust on the road. It is not an uncommon sight to see a "green" driver, fresh from some pseudo-school, where old cars minus accelerators are used for instruction, attempting to drive with an accelerator. It requires knack to use an accelerator properly, which may acount for some of the mistakes that are made.

Another way out of the difficulty, though it is one that very few manufacturers have embraced despite its evident advantages from every point of view is to so construct the pedal that a sideways movement instead of an up and down movement operates the throttle. This reduces the danger of accident more than 100 per cent. in one fell swoop, for no amount of downward pressure, such as might be exerted spasmodically or by accident will open the throttle one iota. Incidentally, the operator's foot rests on the floor of the car and not on the pedal, and he may brace himself to his heart's content without altering the throttle opening. Another advantage of this arrangement is that for ordinary touring the operator is not constrained to maintain his foot in strained position and no amount of jouncing will affect the throttle opening. Notwithstanding these advantages, the manufacturers who have adopted this arrangement are few and far between. Overland cars are made this way and so are Pathfinder cars, and these two would seem to occupy the field alone, though some of the Chalmers cars last year were so equipped.

Barring the swinging accelerator, which certainly is the most logical type, according to the opinions of not a few persons who have driven cars equipped with both types, it seems that the only way out of the difficulty is to place the accelerator so that it must be stretched for—to place it where its promiscuous use will be discouraged and where it will be out of danger of being accidentally "stepped on." As it is, it is necessary for the driver to reach for the brake pedal, providing he drives with the accelerator entirely, as most drivers do, whereas it ought to be just the other way about; the driver's foot should repose on the brake pedal at all times, and it should be necessary to stretch for the accelerator.

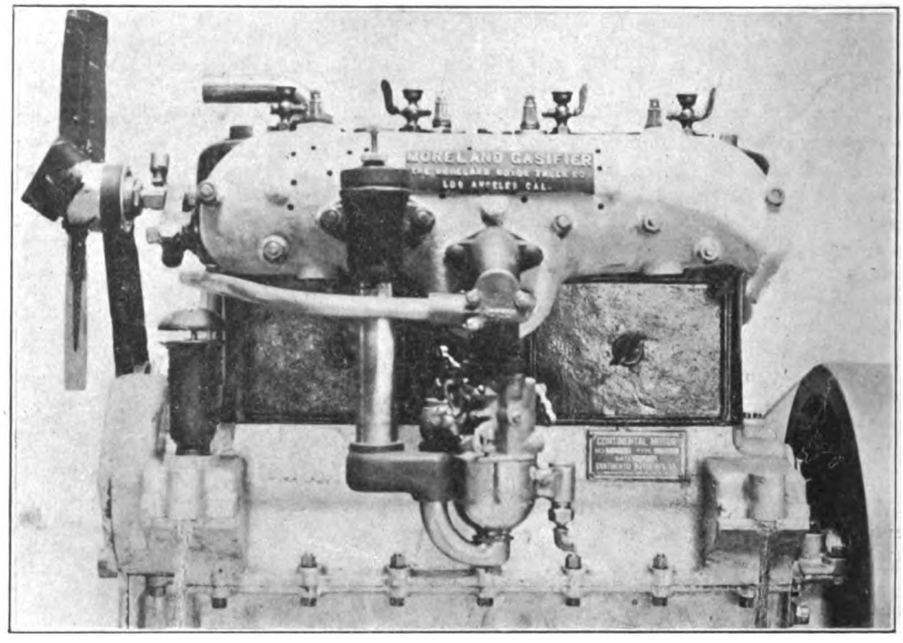
SAVING OF 60 PER CENT. IN FUEL

Claim Made for California Gasifier Designed for Trucks—Uses Distillate but Needs Gasolene for Starting.

As the price of gasolene mounts, and it might be said in parenthesis that it is expected to continue to mount for some time to come, the search for some method whereby the cheaper and heavier hydrocarbons may be employed to advantage goes forward. Kerosene always has beckoned the inventor on in a disconcerting way, and though its use for stationary, constant speed engines has been brought to a point where greater success is obtained now than ever before, the fact remains that its employment for movable, variable speed engines without the use of gasolene as an adjunct for starting and heating up still is a problem that so far has defied solution. Nevertheless, the use of these two fuels in conjunction, though offering certain disadvantages, still offers advantages that cannot be overlooked, inasmuch as it is quite possible to effect considerable economy of operating expense in this way.

Recently, however, not a few manufacturers have turned their attention to the utilization of even heavier fuels than kerosene, and though the same disadvantage of having to use gasolene to generate the heat necessary for starting purposes obtains, results which have been achieved would seem to indicate that the added complication is more than offset by the saving in fuel cost which may be effected. In the case of the Moreland Motor Truck Co., of Los Angeles, which is the first company to undertake the manufacture of commercial vehicles on the Pacific Coast, and whose Moreland Distillate truck was illustrated and described in the March 7th issue of the Motor World, a saving of no less than 60 per cent, in operating fuel cost is guaranteed.

This great saving is effected, it is stated by the company, by the use of what is styled California No. 1 engine distillate, which is obtained from asphalt base crude oils. It sells in Los Angeles for seven cents a gallon, as against 16 cents for gasolene and tests out at about 52 degrees specific gravity. Furthermore, it is claimed that a gallon of distillate will operate a truck approximately 20 per cent. further than will a gallon of gasolene, for the reason that distillate contains the equivalent of 28,000 British Thermal Units to the pound, whereas gasolene of the usual grade contains only some 20,000 B. T. U.'s.



MORELAND GASIFIER APPLIED TO A CONTINENTAL MOTOR

In its simplest aspect—and it is delightfully simple—the Moreland Patent Gasifier, which is the device that makes possible the use of the heavier fuels—any liquid hydrocarbon from gasolene to kerosene being used with equally good results—consists of a cast jacket which surrounds both the intake and exhaust manifolds. The carburetter of the engine is fitted with a two-way cock and a small auxiliary tank of gasolene is used for starting, one gallon having been found to suffice for several days. Soon after the engine has started and after it has run long enough to heat the exhaust manifold, the gasolene is shut off and the distillate turned on. Short stops do not necessitate that the engine be restarted on gasolene, as the jacket of the Gasifier retains its heat for long periods. Though it might be supposed that the heavier fuel would cause carbon deposits and excessive smoking, it is explained that carburation is so complete that these difficulties are practically overcome.

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TAXICABS NEED NOT LOSE MONEY

Right Cabs and Right Management Make Profits—Barker Enumerates Several Notable Instances and Gives Figures.

Much has been said and as much written on the subject of the expense of operating taxicabs, and if an average were struck, so to speak, of the opinions expressed the inevitable conclusions would be that making a profit from a taxicab service is not a little like the proverbial squeezing of blood out of a stone. But though unprofitable taxicabs are all too common, they are not by any means the only kind, according to John G. Barker, of the the Franklin Automobile Co., who has very distinct views of his own on the subject, and does not hesitate to express them. Barker particularly refers to the Pittsburgh Taxicab Co. as a concern that proves his contention that taxicabs do not have to be money losers.

"This company," said Barker recently, "operates 45 motor cabs, and is unique in that its operation is in charge of a firm of public accountants, who receive all of the fares collected by the drivers, make all disbursements and render a statement each morning of the preceding day's business. By systematic management this company has held its operating cost down to 31.6 cents per mile, including chauffeurs' commissions, tire mileage, depreciation, insurance, repairs, rent, garage wages, office salaries, taxes, licenses, executive salaries, telephone and every possible expense that can be figured against the service. The average tire cost with the Pittsburgh company is about three cents per mile, and the cost of operating taxicabs in Pittsburgh is probably as great as in any city in the United States, owing largely to the fact that its hills are many and steep.

"That isn't the only one," continued Barker, "there are others. A concern in Brooklyn cleaned out an equipment of cabs that had proved unprofitable and made a fresh start with a new fleet. The initial payment on the new cabs absorbed the new capital brought in, but within two years the earnings had paid for the new machines and furnished working capital during that period as well. A few months ago a New York company started with five cabs, then added six and now is adding five more, all the money required for the purchase of the machines having been derived from the earnings of the cabs.

"If you want actual figures, there's a man in Boston who started a taxicab business only last November and already has it on a paying basis. He claims to get an average of 11.1 miles per gallon of gasolene and 312 miles per gallon of lubricating oil; his tires cost him 2.2 cents per mile, and his cabs cover an average distance of 47 miles per day.

"There's a Denver company, though, that has the best record I know of for economical cab operation, for it actually manages to keep all expenses—driver's salary, tires, oil, gasolene and all the rest of it—down to 13 2-3 cents per mile."

Not a few smaller cities are blessed with taxicab services that are in the money-making class, according to Barker, and in some instances the vehicles are required to run considerable distances into the suburbs of their respective towns.

These statements are of peculiar interest, in view of the somewhat gloomy financial aspect of the taxicab business in general, and while the vehicles employed in the services referred to by Barker are Franklin cabs, this does not in any way alter the fact that there is money in taxicabs that are sufficiently light and springy to be easy on their tires and sufficiently economical in their demands for gasolene, oil and repair parts to leave for profit at least part of the fares collected.

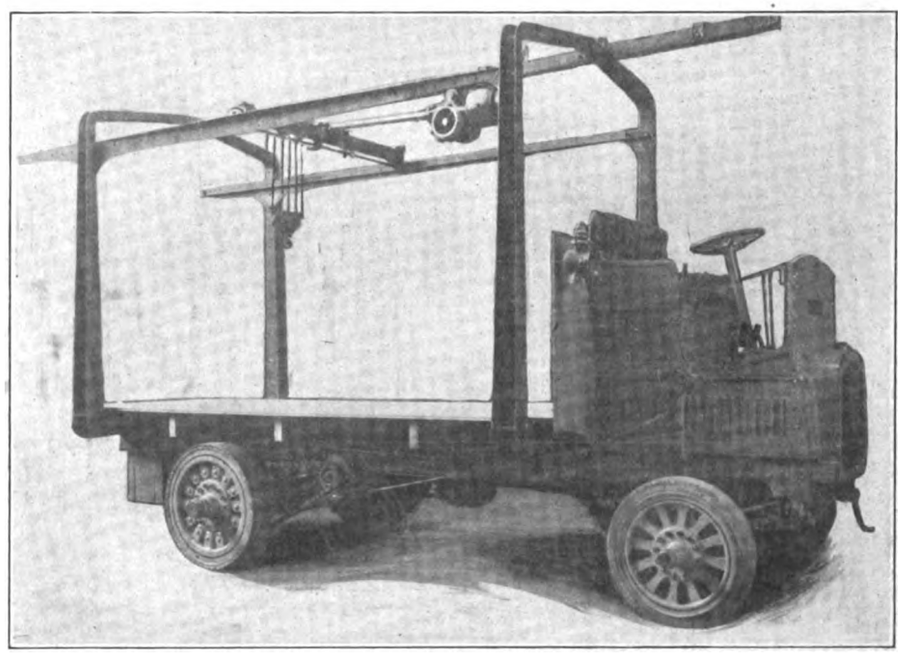
Unusual Excuse For Truck Drivers' Arrest.

The ways of the New York "cop" often are past understanding. Because a Pierce-Arrow demonstrating truck did not "bear sufficient evidence of hard work to warrant carrying a manufacturer's license" one of the bright bluecoats arrested the driver, Frederick Kurtz, and both driver and truck endured three days of enforced idleness before explanations could be made to a Brooklyn police justice, who dismissed the charge. The Automobile Dealers' Association of New York is so much incensed that it has laid formal complaint before the Police Commissioner, alleging unnecessary officiousness on the part of the arresting policeman, and emphasizing the loss of three days' work by the truck and driver, which complaint may or may not convey understanding to the "force."

TRUCK WITH A TRAVELING CRANE

French Manufacturer Brings Out Unique Device for Facilitating Loading—Storage Battery and Motor for Power.

In appreciation of the fact that the successful operation of motor trucks on a paying basis necessitates that their efficiency as so much machinery depends to a great extent on whether or not they are maintained in constant use with as short periods of inactivity as is possible, the manufacturers of Delahaye trucks, which are products of French extraction, have evolved a unique auxiliary loading device



DELAHAYE TRUCK WHICH EMPLOYS AN ELECTRIC TRAVELING CRANE

in the form of a traveling crane. Winches operated either by hand or by the engine of the vehicle are not scarce, of course, and long since have proven their worth in facilitating loading and unloading, though so far as is known this is the first time a power operated traveling crane has been installed for the purpose of shortening the stops enforced when the truck must be loaded or the load discharged.

The truck on which the crane is mounted is a standard five-ton model and differs in no way from other five-ton trucks of the same make, except for the addition of the auxiliary machinery. It is driven by a gasolene engine in the orthodox manner, which is to say power is transmitted to the driving wheels through the intermediary of a selectively operated change speed mechanism and side chains. Differing from ordinary construction, however, the rear wheels which support the greater part of the load are shod with steel tires; the front wheels are equipped with rubber tires.

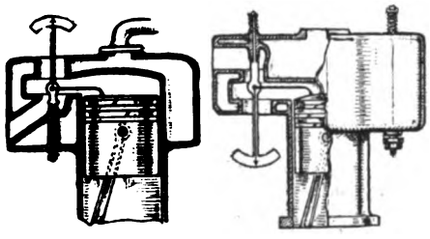
The crane is supported by means of channel section girders of inverted U form, the

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traveler being mounted on side rails that are riveted to the side girders and thus serve to brace the whole. Power for the crane is obtained from an electric motor which drives through a worm gear and is carried by an overhead longitudinal track of such length that merchandise may be lifted from the road at the rear of the truck and deposited close up to the back of the driver's seat if necessary. The load that is lifted by the crane may be moved both transversely and longitudinally by means of the motor, the source of current being a storage battery of fairly large capacity that is carried in a receptacle at the rear and below the platform of the body.

For Indicating the Dead Center.

To determine the dead center point on motors with centrally located plugs needs but the insertion of a rod or stick through



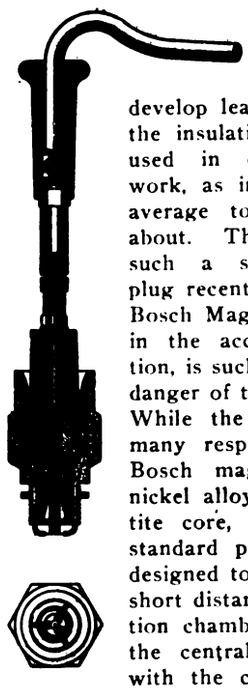
the spark plug hole, a turn of the fly wheel and a watchful eye. The usual method, where the spark plugs are located over the valve pockets, however, is to partially close the pet cocks and listen to the "wheeze." It is obvious that the latter method is rather crude and not productive of the best results, and certainly not accurate enough to be relied on if the valves are to be timed. In the effort to remedy this lack a very simple "dead center" indicator has been devised abroad for use in motors where the only access to the piston is through the port. As shown by the accompanying illustrations, the contrivance consists of nothing more complicated than a bell crank lever, one leg of which protrudes through the port and touches the top of the piston, while the other forms the indicating needle. The lever is pivoted to a stand bearing a quadrant over which the needls travels, and also provided with a stem which passes through the valve stem guide, where it is fastened by means of a nut and coil spring. The weight of the lever which touches the piston serves to keep it in constant engagement with the piston so that the slightest movement is indicated. The indicator can be used with the needle pointing either up or down, as the pictures show.

Handy Means of Reducing Fractions.

By way of alleviating the troubles of those who have occasion to reduce common fractions to decimal fractions the Standard Roller Bearing Co., Philadelphia, Pa., has gotten out and is distributing a handy little celluloid conversion table of the "clock" pattern. It is square, to fit the vest pocket, and the decimal equivalents of common fractions appear on a circular disc in red through "windows" in the outer casing. Any decimal equivalent from 1-64 up to 63-64 can be ascertained quickly and easily by merely turning the center circular disc until the common fraction and the decimal appear at their respective "windows."

Bosch Sprak Plug for Heavy Duty.

Spark plugs used in heavy duty motors that are expected to run for long periods without stopping, or in motors having high compression, or under other conditions of more than usual severity, are more liable to become overheated and to develop leaks and trouble with the insulating core than plugs used in comparatively light work, as in the motor of the average touring car or runabout. The construction of such a special heavy duty plug recently developed by the Bosch Magneto Co. and shown in the accompanying illustration, is such as to minimize the danger of trouble in such cases. While the plug is similar in many respects to the regular Bosch magneto plug, having nickel alloy points and a steatite core, it differs from the standard pattern in that it is designed to project only a very short distance into the combustion chamber. The flat end of the central electrode is flush with the crescent-shaped ends of the side electrodes, and, owing to the comparatively small area exposed to the heat, it is claimed that the points will not fuse under any conditions of service, the heat being conducted away fast enough to keep them adequately cooled. As in the regular Bosch plug, packing is effected by means of copper gaskets. A hard rubber protector receives the end of the high-tension cable, protecting the bared end of the wire and also supporting the cable where support is most needed. A set screw is provided to clamp the wire to the terminal, a fastening which is at once simple and secure.

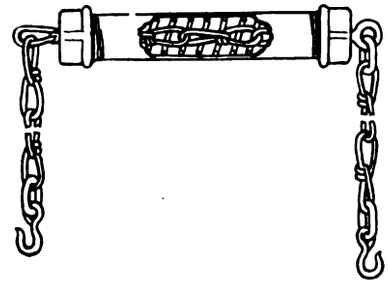


Relation of Float and Float Chamber.

The relation of the size of the float to the size of the float chamber is a matter of more importance than appears at the first glance. If a carburetter is detached from the motor and the chamber filled with gasolene, a sudden movement will, owing to the inertia of the liquid, cause a certain amount of movement of the float, which movement will cause the admittance of more fuel, raising the level in the float chamber above the top of the jet. The same thing happens when the carburetter is placed on the motor and the car is traveling over rough roads, and choking and irregular running are the results. The remedy is suggested by a practice which is common among seamen to prevent "slopping" of a water contained in a pail and consists of placing on the water a circular float of very near the diameter of the pail. The inertia of the float counteracts the inertia of the water and the level of the water is preserved. If the carburetter float were made large enough nearly to fill the chamber very much slopping would be prevented.

To Ease the Shocks When Towing.

Towing a disabled car is an unpleasant job at best, and the task is not made any easier by the sudden jerks that usually are unavoidable, and which sometimes are the cause of bent or strained parts. With a view of preventing trouble of this kind, the Auto Towing Device Co., of Cleveland, O.,



has brought out the "Jarless" towing device. This consists of two chains connected together by a sort of spring buffer—a cylindrical metal casing containing helical springs which are compressed under a pull and ease the shock of a sudden start. The chains are stout and strong, and two hooks are fitted for attachment to towed and towing machines; a swivel joint is provided, so that if the chain is accidently twisted it will straighten itself out. The total length of the chain and spring is 15 feet.

Simple Method of Filtering Oil.

Where the pennies are watched, a saving in the yearly lubricant bill can be effected if all of the oil which periodically is drawn from the crank chamber of a motor is filtered and re-used. A simple method of filtering, and one which is effective, is to place the dirty oil in a bowl and position a length of lamp wicking so that it will reach from the bottom of the bowl and over its side so that the wicking will conduct the oil into another receptacle and leave the dirty residue behind.

Radiator Caps That Require Care.

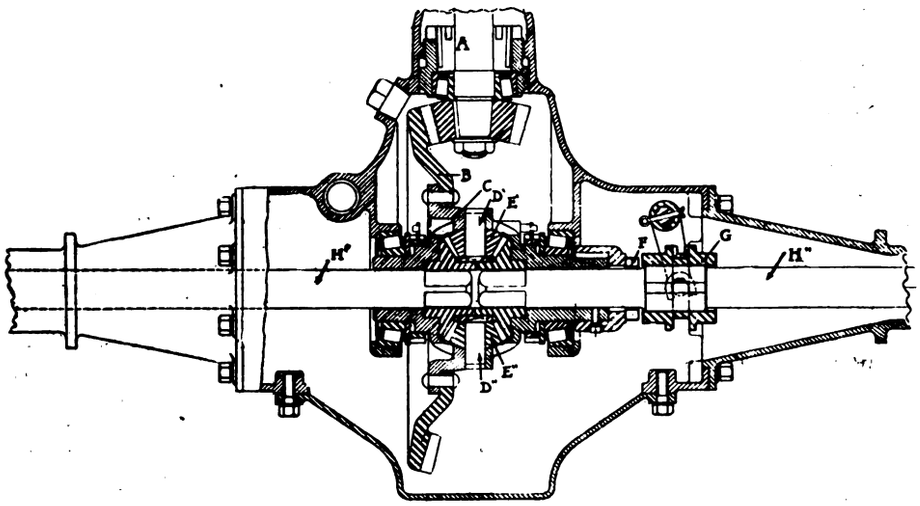
There are not a few manufacturers who now fit radiator caps that fasten with clamps or else crew on with good, heavy threads, but there still are some whose radiator caps have regular "optical instrument" threads that are hard to start and that jam so easily as to be a nuisance, to say nothing of the ease with which they get crossed. The only thing to do is to take time and care to put the cap on properly and avoid spoiling the thread.

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DIFFERENTIAL LOCK CONDEMNED AND DEFENDED

Its Functions and the Manner in Which it Operates Made Plain—Havoc its Use May Work Unless Proper Precautions are Taken in Designing—Engineers' Opinions for and Against the Device That Reveal its Present Status.

When winter weather gives way to spring and under the influence of April showers roads, which during the "off season" have been neglected, become near-morasses, it is a comparatively common sight to see a heavy motor truck stalled in the mud, one wheel on terra firma and the other revolving idly and churning up the semi-liquid real estate. Much the same occurrence takes place often enough when there is snow or ice on the ground and only one driving wheel "bites" the road. Under such circumstances, however, it is a comparatively simple matter to move the vehicle a little by means of levers until both wheels exert the same tractive effort, though in mud, or sand, it is quite a different matter, as the idly revolving wheel digs a pit for itself in a short time and conditions become still more complicated.



PLAN VIEW SHOWING DIFFERENTIAL LOCK AND ITS OPERATION

All of which is due directly to the action of the differential gear. The differential has been described as a necessary evil; there is no doubt but what it is a necessity and also that it is an evil under certain circumstances. As every one who is even remotely acquainted with automobiles for either pleasure or commercial purposes knows, a self-propelled road vehicle cannot exist without some means of equalizing the driving effort on both driving wheels at all times. For instance, when a vehicle is rounding a corner, the outside wheels travel in the arc of a circle of great radius than the radius of the circle on which the inside wheels travel. Consequently the outside wheels travel a greater distance than the inside wheels, though the unit of time is the same. Therefore it is impossible to connect the two driving wheels solidly together and apply the power in the same proportion to both of them, for they seldom rotate at exactly the same speed. There always is a certain amount of relative movement between them. It is the purpose of the differential gear, or balance gear, or equalizer, the terms being practically synonimous, to permit this relative movement while at the same time causing the driving strain to be balanced between the two wheels at all times.

Unfortunately, however, differential mechanisms are not as perfect as they might be. That is to say, the mechanism is just about as perfect as it is possible to make it in its present form, but that this form really requires revision—that the attainment of the desired ends should be accomplished in some other way—is a matter which scarcely requires enlargement. As has more than once been advocated, the type of differential that is desired is one that will compensate for distance and not by distance. But until such a mechanism is devised, and recent attempts which have been made lead to the optimistic conclusion that the solution of the problem is nearer hand than generally is supposed, it remains to get along with existing types and to adapt them to the work in hand, in so far as is possible.

Though the action of the differential gear is fairly well known, it may not be irrelevant, by way of assisting in the explanation of the action of the differential lock, to interpolate a short description of the functions of the differential and the manner in which it operates to equalize the driving strain. The differential may be likened to a beam suspended by means of a rope attached at its center; it is to be assumed that the beam balances. If an equal pressure be brought to bear on both ends of the beam, a straight pull up on the suspending rope will result in the beam being moved upward though its relationship with the suspending rope will not be altered. Which is to say, that it still will remain horizontal and parallel to the earth. But if either end of the beam be anchored so that it cannot move, the beam being as a lever of the second class, having equal arms, the other end will move through twice the space in the same time that it would under ordinary circumstances with the same pressure acting on both ends. A familiar example may be found in the whiffle-tree as commonly used on wagons that are drawn by a team of horses, its object being to equalize the pulling power of both animals.

The differential as used in automobiles is, of course, vastly more complicated than the simple suspended beam or the whiffle-tree, though the principle involved is exactly the same. Thus, for instance, if one driving wheel of a vehicle rests on a dry, hard surface, in which case the traction obtainable is at the maximum, it then becomes as the anchored end of the suspended beam. If the other wheel is on a slippery surface it becomes as the free end of the beam and consequently rotates at twice the speed it would if both wheels were on equally hard and dry surfaces. Which, briefly, makes plain the shortcoming of the present-day types of differential gears. As long as the traction obtainable at both wheels remains greater than the tractive effort put forth, the differential acts as an equalizer or a balance gear and the power available is proportionately distributed between the two wheels. When one wheel loses all traction, however, the differential is no balance gear, as it then permits all the power to be transmitted to the one wheel which is rotating idly, the other wheel at which traction is available remaining, to all intents and purposes, dead. Consequently, what is desired is a differential gear that will act to equalize the driving strain on both driving wheels under every condition and all conditions of road surface.

So far, no such mechanism has been developed, at least to the stage where it is of commercial value, though, as has been stated, numerous attempts have been made,

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and it is not unlikely that eventually a solution of the problem will be forthcoming. In the meantime, as a differential gear of some sort is absolutely essential, the shortcomings of present-day types must be overcome and it is the purpose of the differential lock to overcome the prime fault that just has been outlined.

As the name of the device indicates, its purpose is to lock the differential, or, in other words, to cut it out of operation temporarily in order that all the power may be applied to either of the driving wheels which may be on hard dry road when the other wheel is on a slippery spot. The locking of the differential has the same effect as would be obtained if in the example of the balanced beam suspended at its center two braces were placed between the ends of the beam and the point from which the beam was suspended.

It is but natural that each manufacturer should have his own particular method of locking the differential mechanism. The principle remains exactly the same in any case, however, and is made plain by the accompanying cross-sectional picture, which shows a lock with its relationship to the rest of the differential mechanism.

In the drawing, the propeller shaft is designated A and the driving shafts as H' and H". B is the bevel driving wheel, and it drives the differential pinions E' and E" through the pins D' and D", which are mounted in the cage C, to which the bevel drive wheel is bolted. The driving shafts (H' and H") are not connected to the inside differential cage (C) in any way, but are free to rotate in it. They are driven by means of the horizontal pinions, which mesh with the pinions E' and E". Consequently, if the traction at each driving wheel is the same the pinions in the differential remain in their relative positions and the whole cage (C) rotates as a unit, imparting the same motion to both driving shafts. If, however, one of the driving shafts is maintained stationary, as it would be if one wheel only was on hard, dry road, and the other was on a slippery spot, then the pinions E' and E" (there are four of these pinions, though only two of them are shown in the drawing) would roll around the pinions to which the stationary shaft is connected, and in doing so would multiply by two the movement imparted to the other drive shaft.

It is in preventing this relative movement betwen the two driving shafts that the differential lock serves its purpose and the method of preventing the movement is as simple as it is efficacious: The lock is simply a sliding sleeve (G), which fits over a squared portion of the driving shaft (H") (it would operate exactly the same no matter which of the driving shafts it is on) and engages with teeth (F) on the end of the differential cage (C). When the sleeve is moved up into engagement with the teeth on the differential cage one driving shaft is locked fast to the cage, and as relative movement between the pinion into which the driving shaft fits and the pinions E' and E" thereby is made impossible it follows that relative movement between the other pinions also is impossible. Consequently the two driving shafts are locked together and rotate as one. As has been previously stated, there are several other methods of locking one of the driving shafts to the differential cage, though the ultimate effect obtained is the same, regardless of the system in use.

The purpose of the differential lock already has been explained, but despite the very evident advantages of the device under certain circumstances not all manufacturers incline to its use. Opinions as to the actual value of the device are divided; some automobile engineers decry its use in no uncertain terms, while others, some of whom have equipped their vehicles with it for a long term of years, speak very highly of it and state that they have no fault to find with its operation.

Cornelius T. Myers, who is chief engineer of the General Motors Truck Co., Detroit, Mich., is one of those whose damning of the device does not even take the form of faint praise. "A differential lock was tried on several of the General Motors Co.'s trucks," says Myers, "but it was dropped. It was found not only an unnecessary complication, but a dangerous one. It also greatly adds to the weight of the parts affected by its operation. Not only must any standard size countershaft for a given horsepower be doubled in size in order to take the total engine torque when one wheel is slipping and the differential is locked, but one should really also redesign the mental functions of the driver. This is not intended as a reflection upon drivers, as will be seen from the following:

"The differential was devised and installed for the purpose of supplying compensation between two driving wheels; it is absolutely automatic in its action. The locking of the differential removes this automatic function and in its place is left the judgment of the driver to determine exactly when the relative rotations of the wheels require compensation and to unlock the differential lock at that precise, particular moment. If he does not act as promptly as the differential itself would act, breaking tendencies are set up in all the parts affected and the tires will have a tendency to tear off. When any of these things actually do happen, the driver unjustly gets the blame."

"No human intelligence is sufficient for the task of unlocking the differential always at the scientifically correct moment," Myers sums up the situation, "and any moment less than scientifically correct makes the lock too dangerous for a careful manufacturer to sell to a confiding customer."

All of which is interesting as coming from a man who undoubtedly has had a great deal of experience in the designing and construction of commercial vehicles. However, despite the pithiness of Myers's remarks, several of the statements require slight modification, for it should be remembered that the differential lock is a device which is intended for use primarily in emergencies and only for very short periods. Though it has been suggested that the differential lock serves one of its most useful purposes in permitting a truck to be driven with one chain broken when the truck ordinarily would be hors de combat unless the driver was supplied with repair parts, such use of the device scarcely can be advocated for the very reasons that Myers points out. No matter how smooth the road may appear to the driver, nor how straight a course he may imagine that he is pursuing, his judgment may be at fault. Every time one wheel mounts an obstruction or drops into a declivity—no matter how slight the obstruction may be or how shallow the declivity—then that wheel ordinarily would travel a greater distance than the other wheel, which rolls over perfectly smooth road, provided the differential were in operation. It is the purpose of the differential to permit this relative motion between the two driving shafts as already has been pointed out. It stands to reason that when the movement is not permitted there must be set up a certain strain that would not be present with the differential in operation—a strain on both the transmission mechanism and the tires.

Naturally, in those vehicles in which a differential lock is employed the affected parts are made slightly heavier in order to offset the extra strain which is placed on them when the differential is locked. Whether or not the amount of great weight which is necessary is a greater detriment than the presence of the differential lock is a convenience is an open question. At any rate, Mortimer Roberts, chief engineer of the American Locomotive Co., Providence, R. I., is of the opinion that the differential lock is an excellent device and he is not alone in his view.

"The assertion that the lock is in any way dangerous," Roberts says, in reply to a letter of inquiry from the Motor World, "in my opinion is absolutely unfounded. We certainly do consider the differential lock of great value. We have used one for over four years and have yet to hear of any broken chains or shafts caused by its use, so far as the Alco trucks are concerned."

Henry H. Hower, of the F. B. Stearns Co., Cleveland, O., writes in much the same strain and commends the device highly. "Our experience with and without a differential lock on the transmissions of our trucks which we have had in service at our factory the last three or four years," Hower writes, "would indicate that while the number of occasions on which a differential lock is of use is very slight, yet when needed it is a feature that is very desirable, to say the least. In such instances such a lock would ofttimes eliminate the necessity of a tow. We have never had occasion to use the differential lock in order to drive on

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but one chain, but we have used it often in transmitting the power to the one wheel which had traction. And in the ability to do this we believe lies the chief value of a differential lock.

"In regard to the objection to its use, due to unnecessary complication and design, and to added weight, and to danger of its use by inexperienced operators, we do not believe that anf of these objections apply to the device as we design and equip it. The added complication of a sliding jaw clutch mounted on one of the differential shafts and clutching this shaft positively to the differential sleeve is not very much, since it requires but the addition of two pieces in the transmission, viz., a clutch and shifting finger, and on the outside of the transmission a connecting link and operating lever. The weight of these parts is extremely slight, and is a very small addition to the weight of the truck chassis."

Similar views are held by the Velie Motor Vehicle Co., Moline, Ill., and a number of other manufacturers who have had considerable experience with the differential lock as an adjunct to the operation of their vehicles. This does not alter the fact, however, that there is a possibility that any driver may forget—no one is infallible—and leave the differential locked when according to all precepts it should be unlocked and in working order. Nevertheless, not all manufacturers have kept this idea in mind in equipping their vehicles, and it is not unlikely that part at least of the "black eye" which the differential lock has received from some quarters is due to this.

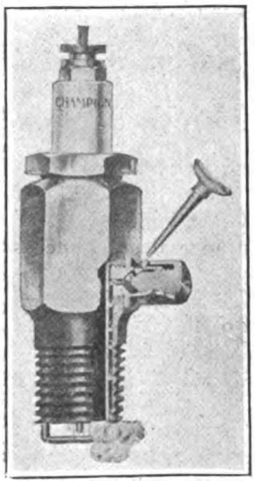
In Velie trucks, however, the engineers have evolved a design which makes it impossible for the driver to maintain the differential locked without a conscious effort. Its use therefore is discouraged except in case of necessity, and the likelihood of its being inadvertently left locked is minimized. This very desirable end has been attained by the simple expedient of actuating the differential locking mechanism by means of a spring-returned pedal. It is necessary for the driver to keep the pedal depressed the whole time the differential is to be maintained locked; immediately the pressure on the pedal is released the differential automatically unlocks itself.

Similar methods are in use on a number of other trucks but the designers of Stearns vehicles have attacked the problem from an entirely different angle. The Stearns differential lock is worked by means of a lever which operates in one of the slots of the change speed lever quadrant and is so arranged that when the differential is lyocked the lever is in such a position that it is impossible to engage any other speeds than low speed ahead and reverse. Similarly, it is impossible to lock the differential when any gears other than these two are in use.

The lock often has saved the expense of a tow and has increased efficiency by reducing the time during which the truck was inoperative. Nevertheless, it is essential that the necessity for the maximum degree of "foolproofness" be kept in mind, and though the differential lock undoubtedly adds slight complication—complication which is so slight as to be practically negligible—the "human element" in the equation should not be forgotten and the manipulation of the device should be so regulated that its use is discouraged except for emergency, and it should positively, and automatically, unlock itself the instant its temporary usefulness is over.

Spark Plug That Permits Priming.

When a motor is very cold and therefore difficult to start, priming the cylinders by the injection of gasolene not infrequently fails to bring about the desired result because the vapor of gasolene, being heavier than air, settles down at the point furthest from the spark plug, and the combustible vapor does not come within reach of the spark. As in such a case the plug cannot well go to the gasolene, the Champion Spark Plug Co., of Toledo, Ohio, has hit upon the idea of bringing the gasolene to the plug by making a priming plug in which the gasolene when injected passes close to the sparking points and offers the best possible opportunity for the spark to ignite it. If there is any warmth in the plug the liquid is likely to expand considerably as it emerges, thereby increasing the chances of ignition. A needle valve in the side of the plug provides a means for injecting gasolene; the arrangement is shown in the accompanying illustration. A cap screws over the valve lug and when screwed all the way on covers the gasolene inlet, while a central tapered plug closes the passage and prevents leakage from the cylinder. The motors of the Ford cars, which are without separate priming cups or provision for their use, are fitted with Champion priming plugs, which recently were placed on the market, as standard equipment.



CHAMPION "PRIMING" PLUG

About Soldering the Ends of Spokes.

Although it has been suggested that the loosening up of wood wheels may be prevented by filling all spaces around the ends of the spokes and in the felloes with melted solder, it is by no means advisable to try such a plan, as the heat of the metal is sure to cause a certain amount of shrinkage of the wood, and the metal itself shrinks in cooling, so that the spaces cannot be properly packed in this way. A wheel that has shrunk through dryness until it is loose can be tightened up by wrapping wet rags around the ends of the spokes, both at the rim and at the felloe, taking care that water is not allowed to get under the tire. An occasional application of this sort will keep wooden wheels perfectly tight in the driest weather.

Spark Plugs and Engine Starters.

A little extra attention should be paid to the spark plugs of a motor employing an automatic starter, mainly because the efficiency of the starting device depends largely upon the ignition, and if the plug is sooted up it is not unlikely to fail to give a spark of the requisite intensity. There are those who believe that the combustion of acetylene has a tendency to add something to the deposit of carbon, and this would of course lend additional urgency to the necessity for keeping a sharp eye on the plugs. When a starter fails to set the engine going, it is a safe rule to examine the spark plugs. One fouled plug often is the cause of the difficulty.

Waste Indicated by Hot Wires.

Trying to force a heavy current of electricity through a wire that is of insufficient size is much like trying to force water through a pipe that is too small. In both cases there will be a drop in the pressure between the source of current and the point of delivery—the electrical pressure being the voltage—and there will be a waste of energy in overcoming the friction or its equivalent. In the case of electricity, however, the trouble at once makes itself apparent by the heating of the wire. A hot wire invariably indicates a waste of current, for it requires a certain amount of energy to generate the heat.

Effect of Water in Babbitting.

When babbitting bearings, or doing any other work requiring the pouring of melted metal, the greatest pains should be taken to see that there is no water, not even the smallest part of a drop, where it will be reached by the metal. The sudden expansion of the water into steam amounts to a small explosion which throws the hot metal about in all directions with results that easily may be serious.

Oil Pump Leak That is Vexatious.

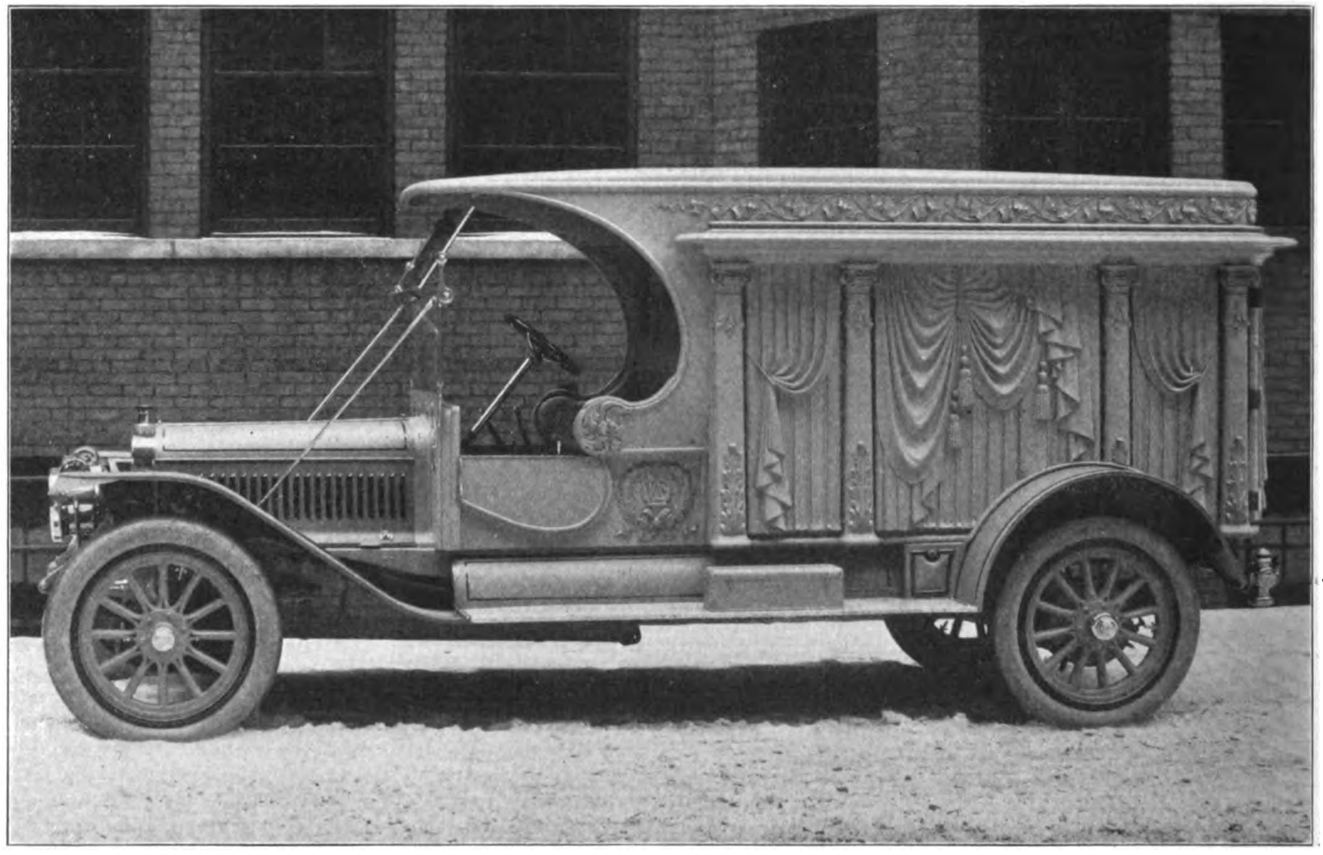
If there is a leak in the suction pipe between an oil pump and the tank from which it draws oil, it will either fail to pump or will pump a smaller quantity than it should pump, taking in air instead of oil Careful examination is required to discover a leak of this kind.

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TEXAS HAS HORSELESS FUNERALS

Dallas Undertaker Provides Motor Hearses and Advertises It, Too—"Hedges" So as to Suit Everyone, However.

While there unquestionably are phases of the undertaker's business that necessarily are of a deliberate character, it cannot be truthfully asserted that the funeral director of to-day is at all slow to avail himself of such aids to success as motor cars. On the contrary, there usually is some little difficulty in bringing the funeral-going public to see the fine points of the new order of things, and this fact has caused at least one wide-awake undertaker to "hedge" by providing two complete outfits, so that he is in a position to advertise—and does advertise—that his patrons can choose between funerals in which horses furnish the motive power as in the past, or corteges in which all the vehicles are motor propelled, including the hearse—true horseless funerals. Undertaker Loudermilk, of Dallas, Texas, is the man, and his hearse is cleverly built on a Winton six-cylinder chassis, the designing having been done so skillfully that the lines of the familiar hearse body merge, without shocking the eye, into the form made necessary by the motor car front, and the imminent danger of producing a vehicle having the appearance of a delivery wagon is avoided. The smooth, silent running of the Winton car makes it well adapted for this class of service. Incidentally, it may be said that the motor hearse forms the last link in a chain, for it now is possible for a man to smash himself up in a motor car, be taken to the hospital in a motor ambulance and, should the worst come to the worst, leave the hospital for his last motoring trip in a gasolene hearse.



WINTON HEARSE WHICH CONSTITUTES PART OF THE EQUIPMENT OF A TEXAS UNDERTAKER

English Notions In Electric Vehicles.

Apparently concerned by the rare probability of death suddenly overtaking the operator, an English firm, Macfarlane & Burge, of Chelmsford, have designed an electric vehicle in which provision is made for even that exceptional contingency. The handle of the controller being brought back to the braking position by the action of a spring when the hand of the operator releases it; in case anything happens to the driver the current thus is cut off and the brakes are set when the dropping hand releases the controller.

The operating and control systems of the vehicle embody several other more or less novel features, all of which have been tried out on electrics in this country with no extraordinary amount of success. Probably the braking entirely by means of regeneration of current is the most interesting feature, for not only are the usual expanding or contracting band brakes done away with, but the kinetic energy of the car is changed back into potential energy, which is returned to the battery in the form of current and stored for future use. The use of a controller of the series parallel type is dispensed with by the introduction of a so-called "motor booster," which limits the amount of current which can be taken from the battery. The motor employed is a specially wound shunt machine and the torque-speed characteristic is said to be similar to that of a series motor.

Old Felt Hats as Magneto Covers.

The suggestion from foreign source that an old felt hat can be converted into a magneto cover is all right as far as it goes, but it should be remembered that the felt, once wet, will hold moisture for an extraordinarily long time and may harbor dampness that will injure the magneto if it is left unused for any length of time. From the same source comes the tip that a smashed tail lamp can be temporarily replaced with an empty jam jar with a candle placed inside. The smudges of jam in the jar supply the requisite red color.

The Sampling of Battery Solutions.

In taking readings of the specific gravity of battery solution, care should be taken thoroughly to empty the syringe of the electrolyte from one cell before taking up a sample from the next, or the figures will not be correct.

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CONDITIONS AFFECTING MOTOR TRUCK SERVICE

Why Motor Trucking Includes Much More Than Motor Trucks and Wherein Excessive Delays Can Neutralize the Efficiency of the Best Trucks — Horses and Horse Conditions Responsible for Much Dissatisfaction With Machines — Examples of Time-Wasting Methods.

It is a fact that in no wise detracts from the merit or the usefulness of the motor truck that the machine itself is only one of many factors that must be taken into consideration in determining whether mechanical transportation in any partcular instance is likely to be an economical proposition or the reverse. In other words, the motor truck is by no means all there is to motor trucking. It is not sufficient that the machine itself be a good one and adapted to the work it is intended that it shall perform. The conditions under which the machine works must be favorable, to some extent at least; the more favorable the conditions, the greater the economy realized from the work of the car, and on the other hand, the more unfavorable the conditions the smaller the economical margin, until the point may be reached where the machine will operate only at a loss, regardless of its mechanical efficiency and the proficiency of the driver.

The prime point of superiority of the motor truck over the horse-drawn truck—that it is capable of transporting freight for less money—cannot be realized, of course, unless the loading and unloading of the machine can be accomplished with a reasonable degree of promptness, and the runs to destinations and return made without unreasonable delays. As a rule the speed that can be made with even the slowest machine is much superior to horse speed, load for load, if nothing seriously interferes with the use of that speed. And it is a comparatively rare thing, though not unheard of, for a truck to be so hampered in its road work as to make it unprofitable, other conditions being of a fairly favorable character. It is evident, therefore, that the most likely causes of unprofitable truck operation are to be found at the loading and unloading points; observation and experience tend to prove that such is the case.

Great bodies are slow to move, and once in motion, it is a slow matter to alter their direction. This is at the bottom of most of the trouble that sometimes is experienced in making motor trucks pay, for the whole world is accustomed to horse haulage and all transportation arrangements have for centuries been worked out with a view to facilitating the use of horses. The conditions that are best suited to horses being in many cases very far from suitable for motor truck work, it follows that the motor truck often is badly handicapped, for not only is it endeavoring to change conditions, but it is trying to do so while horses still are in the very great majority, and horse conditions must, of necessity, prevail to a very great extent for some time to come.

There is one essential difference between motor trucks and horses that becomes painfully apparent when machines are worked under the control of persons who have become thoroughly imbued with conditions that govern the use of the animals, as is the case with most transportation men. The best thing that can be done with a motor truck is to keep it moving as much of the time as possible. There is nothing to prevent a good motor truck from running all day, continuously, outside conditions permitting; but it is essential that horses, especially if they are pulling up to their normal capacity, as is usual in these high-pressure times, should have some little respite between trips, and as a consequence a certain amount of delay at each end of the trip is not only beneficial, but is often absolutely essential, for horseflesh wears out with undue rapidity if pushed too hard. Thus it happens that there are a thousand little delays and time losses that form part of the existing transportation systems and that sorely irk the souls of the truck people because they keep the machines standing when they ought to be on the road earning money—or saving it, which is the same thing on the books.

As an example, the coal business may be mentioned as one in which horseflesh is pushed to its limits, and were it not for the delays that occur in loading and unloading the animals would give out far sooner than they do—which is soon enough, for five years is a long working life for a city coal horse. When a coal wagon is ready for a load in a busy yard it is more than likely that it will have to stand in line for some little time waiting for wagons ahead to get their loads and move on. While in some of the more modern plants chutes are so constructed and the supply so arranged that the loading is quick, ordinarily the process is rather slow, and sometimes it is drawn out by the approaching depletion of the pockets containing the coal. When the load is on it must be weighed, and if the driver's estimate as to weight was not a good one, coal has to be shoveled off or on, as the case may be, until the load is within the limit permitted—20 pounds per ton. After that the driver goes to the office to get his "ticket" or delivery slip, sticks it in his hat and ambles leisurely to his wagon and starts on his plodding way—if the horses do not need to be watered.

Arrived at his destination the horses stand and rest contentedly while the Jehu hunts up the janitor, or the engineer, or someone to sign the receipt, which must be done before the load is "dumped," and then proceeds to get the load off. This may be a simple process, or it may be the opposite. If the coal hole is near the curb, or within reach of the "pan" or wagon chute, and there is plenty of room below, and the coal runs freely, all is well; the load will be disposed of in short order. But in very many instances one or more of these conditions are not present. Coal holes are arranged with more reference to the convenience of the builders than of the coal dealers, and almost everyone has seen a coal chute stretched across the sidewalk to a hole far from the curb, the driver using a shovel or broom with vigor in order to coax the coal down the slight incline. Or it may be that even this is impossible and the coal must be "barreled" across the sidewalk, or wheeled away in wheelbarrows, and it is entirely possible to fully occupy an hour and a half in handling a load of five or six tons in this way.

Again, it is a common thing for the driver to descend to the coal cellar and crawl on his stomach over coal piled almost to the ceiling in order to reach the bottom of the coal hole and clear away the coal as it comes down, so as to make room for the load. It is nothing short of exasperating to put a motor truck at work that is delayed in this way and find that it is forced to stand idle perhaps sixty per cent. of the working day, when such idlness, which, of course, is not in any way the fault of the machine, is making the difference between success and failure. It is unfortunate, too, that motor trucks working under such conditions too often are judged—and sometimes condemned—solely on the basis of tonnage handled, without consideration of the reasons for unsatisfactory results shown on the weekly reports.

Obviously the remedy is not vested wholly in the owner of the truck, but is divided between him, the receiver of the goods and to some extent, the operator of the machine. As the Peerless Motor Car Company's truck department aptly expresses it: "Delays are costly not alone because they mean a tied-up investment, but because they rob the truck of an opportunity to create values—what the economists call place values—in excess of the

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amount represented by interest on the truck investment. Successful co-operation in motor trucking is a three-cornered affair. It must include the shipper, the truck operator and the receiver, whether all three happen to be parts of a single company or are separately managed. The more complete the co-operation is the more work the truck will do and the greater will be its value."

While the coal industry furnishes a striking example of conditions that are difficult to overcome, it is by no means the only business in which machines are placed at a serious disadvantage and their usefulness unnecessarily curtailed. The same deliberation in loading and unloading and the same lack of facilities at both ends of the trip are found in nearly all classes of business. And the part of it that the truck maker or dealer feels most is that the man who buys a machine or makes use of one very often looks no further than the records of work done, and forgets—and often declines to be reminded of—the reasons why the machine failed to meet his expectations. In many instances the real source of trouble has been recognized and the obvious remedies applied, with such excellent results that a number of truck concerns now make a specialty of service departments devoted to the task of helping truck users to discover and eliminate conditions that militate against the profitable use of machines.

"Rubbernecks" Barred from Parks.

No longer will the voluble and leather-lunged megaphonist of the sight-seeing motor car expiate on the beauties of Central Park to his admiring passengers—unless he does it outside the confines of the big playground. New York's park commissioner has decided that the big machines are a menace to other vehicles on the park roads, and also that the passengers on some of the more elevated cars are in danger of being left hanging on the lower branches of the park trees; therefore the park police have been given orders to exclude the rubbernecks, and they are obeying orders to the letter. Section 19 of the park ordinance prohibits the use of the park roads by commercial vehicles and motor vehicles let for hire, and the sight-seeing wagons are classed under the latter heading. While taxicabs belong to the same class, both they and the sight-seeing cars have ignored the rule for so long that the commissioner's order was not at first taken very seriously, and it was not until a court summons was presented to a chauffeur of the Manhattan Sightseeing Co., who disregarded the rule, that it was realized that the commissioner was in earnest. Some months ago the sight-seeing companies, objecting to being shut out, took a test case to court, but as yet no decision has been reached, and in the meantime the big cars can do no better than skirt the edges of the park and let the sight-seers exercise their imaginations under the able stimulus of the elocutionist at the small end of the megaphone.

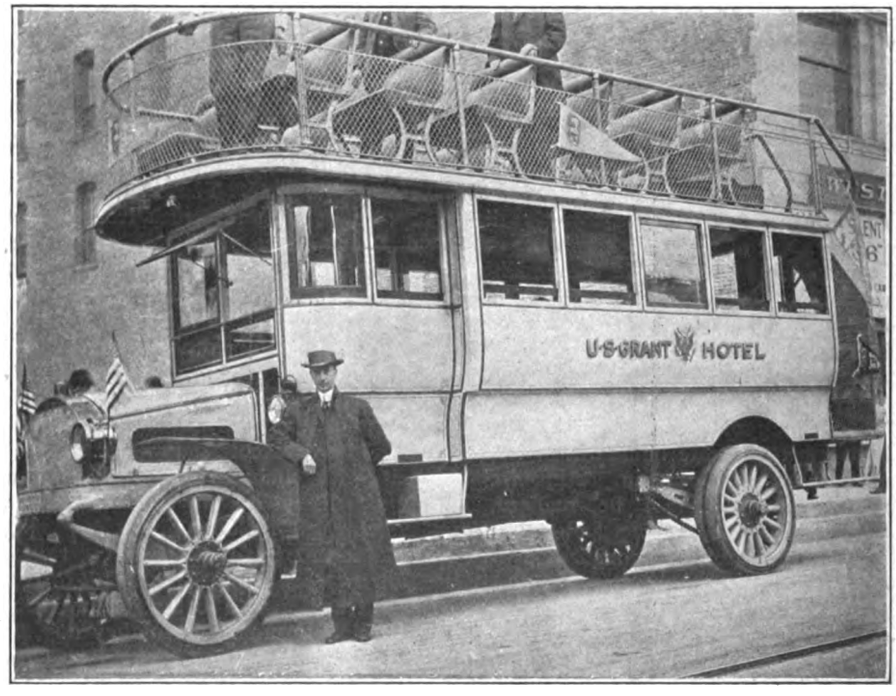
BIG BUS CARRIES FIFTY PASSENGERS

Built in Los Angeles and Claimed to be Largest in the World—Its Proportions and Features.

What is claimed by its builders to be the largest double-decked motor omnibus in the world has been built in Los Angeles, California, by the Western Auto-Body & Mfg. Co. for the U. S. Grant Hotel in San Deigo. The huge vehicle, the proportions of which are well shown in the accompanying illustration, has seating capacity sufficient for no less than 50 passengers, and and chassis, necessarily of the most substantial character in order to carry the great weight, is of the 5-ton truck type. Carrying passengers, however, and not inanimate freight, more than truck speed is demanded, and the power plant therefore is a big one, consisting of a 90-horsepower motor mounted in the conventional forward position under a hood; final drive to the rear wheels is by side chains. The length of the wheelbase gives a good idea of the hugeness of the double-decker, the distance from axle center to axle center being 192 inches—16 feet. The length of the machine over all is 28 feet and the height 12 feet 6 inches.

All seats face forward and are finished in leather. The arrangement of the upper deck is substantially the same as that of the double-deck Fifth avenue busses so familiar to New Yorkers, the deck being surrounded by a substantial pipe railing and a guard of netting; a curved stairway at the rear leads to the roof. Mahogany finish, with electric dome lights, makes the interior decidedly a pleasant place to ride in, and in warm weather the plate glass windows are dropped out of sight into pockets. The driver has a separate compartment of his own, which he enters from the right hand side of the car, so that in inclement weather he is thoroughly protected—an arrangement calculated to make the driver of a Fifth avenue bus turn green with envy.

The U. S. Grant Hotel will use its new "land liner" not only for conveying guests to and from the railroad stations, but will also run it on sight-seeing trips in the neighborhood, for which purpose it is well adapted.



HUGE BUS IN USE BY A CALIFORNIA HOTEL

Willys's "Baseball Day" in Toledo.

John N. Willys's annual "baseball day" in Toledo was even more of an affair than was the case last year, when it was inaugurated. The parade to the grounds to view the opening game between Toledo and Milwaukee was really in the nature of an industrial turnout, which emphasized the importance of the automobile industry, some 5,500 men and women being in line. They comprised the employees of not only the Willys-Overland factory, but the Kinsey and Warren companies, in both of which Willys is the dominating factor. President Willys and the other officials of the three companies headed the parade, which was made up of four divisions, each led by a band, all of the paraders displaying a cane bearing an Overland pennant, and a badge bearing Willys's picture. Along the line of march and throughout the joyous demonstration which marked the game, moving picture men snapped the scene, of which there were many that were worth snapping. The band and the crowd and the flag waving made a scene that in all probability long will be remembered.

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PROFITABLENESS OF AUTOMOBILE BUSINESS DEBATED

North Dakota Implement Dealers Takes Sides and in Open Meeting Discuss the Subject—An Expression Given to Some Instructive Views and Figures—One of Them Argues Against Himself—Factors That Make for Success or the Lack of it.

When the man made up the program for the last annual meeting of the North Dakota Implement Dealers' Association, he created a somewhat unusual state of affairs. He thought it would be diverting and instructive to have discussed the profitableness of automobiles when sold in connection with agricultural implements. Accordingly he programmed such a debate, placing it in the form of a resolution as follows: "Resolved, That the handling of automobiles is not profitable for the average implement dealer." To the affirmative side he assigned C. O. Russell, of Devil's Lake, and to the negative F. W. McRoberts, of Casselton. It so happened that both men for several years have successfully handled automobiles in conection with implements, but apparently the program maker was unaware of the fact, at least so far as Russell was concerned. Russell, nevertheless, accepted the task, and after good naturedly explaining his apparently inconsistent position he proceeded to show how and why under certain conditions the sale of automobiles is unprofitable. His assertions and illustrations, taken in connection with his opponent's defense of the automobile business, threw some instructive sidelights on the subject which can be turned to advantage by not a few of those who are engaged in the trade, whether or not they are handling automobiles in connection with agricultural implements.

In his effort to prove that the profitable business in which he is engaged really is unprofitable, Russell said:

"Is it profitable for the ordinary implement dealer to handle automobiles? The only way I can see that this can be decided is to get down to actual figures. To do this we will suppose a case. Take the average implement dealer in a small town, say of seven hundred people. First, you must consider that there are always at least two dealers in a town of this size. This fact you must bear in mind all through the argument, and that is, the man we have in question gets only one-half of the business of that territory. For convenience sake, we will call this dealer Mr. Jones. We will start at the time when he has picked out his car and has made a contract, saying nothing about the time and money he has spent in looking up the different cars to see which is best suited to his particular needs. He has picked out a car listed at $1,000 and the contract calls for a dealer's commission of 15 per cent.

"Now, we are going to count our chickens before they are hatched, and Mr. Jones is going to sell four cars in the season. His commission on these four cars is $150 apiece, and will amount to $600. Mr. Jones has made $600. We will now see how he has spent this. In the first place, when he made the contract for the cars, he made a deposit of $50 per car, or $200. Of course, when his contract is up this money comes back to him, but he has lost the interest on it at 8 per cent., which amounts to $16. Then, about the first of February, someone comes in and makes the fact known that he is thinking of buying an automobile some time. Mr. Jones immediately gets busy and commences to talk automobiles. He probably puts in half a day, and then his prospect says that he will not buy an automobile under any consideration without first seeing the car. Mr. Jones feels certain that he can sell this man, so orders a demonstrator. In the course of a few days the car comes, with a bill of lading attached to it for $850, and we will say for the sake of easy figuring the freight on this car amounts to $50, making a further investment of $900.

"On the first day, Mr. Jones hunts up his prospect and takes him out for a little demonstration work. By this time he finds that his prospect has talked with other agents for automobiles and is not quite so sure that he wishes to buy now, as he will not be able to use it until the 15th of April, and at that time he will see about it.

"I merely mention such a situation to establish that foundation for the statement which I now make: That it will take four good days for any man to sell a car, and that this would be at least the average time it would take to close a deal. Some persons would take more, others less. Now, then, Mr. Jones's time, if he is running a successful business, it worth at least calculation $100 per month, or $4 per day, making the wage cost for selling each car $16, or $64 for the four cars which he sells. The unloading of these cars will cost him $2.50 apiece, or $10 for the four. Filling up each car with gasolene and oil, which the dealer will do for his customer on seeing that he has made a good profit on each car, will cost him $3 each, making $12. Further, Mr. Jones will find that when he comes to deliver the car his customer does not want the car that he has been demonstrating with, but will want a new car. Therefore, he will have to keep the demonstrator and get a new car for the customer, and he will find the same excuse when he comes to deliver the rest of them, so that at the wind-up of the season he will have worn out one set of tires.

"About that time he has had enough of the automobile business. He will have to buy a new set of tires, costing about $100, put them on his car, and then offer his demonstrator for sale at a discount, and he will be lucky if he sells it for a discount of $300.

"In one of his sales he ran across a customer who was what we call a tightwad, and in order to make this sale he discounted the car the amount of the freight, thereby losing $50 of his commission. Then, counting the time spent with prospects to whom the other fellow sold cars, he has spent fifteen days, which, at $4 per day, would amount to $60. Oil and gasolene that he used while demonstrating, $22.50. Then the repairs on his demonstrator—tire punctures and one broken spring—would amount to about $9.

"The interest on the money invested in his demonstrator for eight months amounted to $42. Figuring up the total of these amounts, we have $709.50. Subtract this amount from his commission of $600, and this would leave him a net loss of $109.50 for selling four cars.

"There are numberless other small items of expense that will be added to this loss, such, for instance, as when one of Mr. Jones' customers who lives out in the country telephones and says that he has tried for two hours and a half to start the car and it will not go, and he wants Jones to come out and start it for him. Mr. Jones goes out and finds that he has shut off the gasolene, his tank is dry, he has failed to turn on the switch, or his batteries are disconnected, or a hundred and one other reasons why the car did not start, and which any man could fix if he would use his head; but Jones has had the expense of going out there.

"I do not want you to gather the idea from the argument I have presented that there is not money in the automobile business; but the business of selling automobiles is a business by itself, and should be run as such, and cover all parts of the automobile field. I do claim that there is no money in the business of selling automobiles alone, for any man, no matter what kind of business he may be in; but that in order to make a success of the automobile business he must not only sell automobiles, but repair and store them and sell accessories for them, and have one or more of his own, so that when the weather and

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roads are in good condition he will be able to add to his income by doing a livery business. The whole must be governed by more than the average amount of good judgment and strict attention to business. I believe that the average implement dealer, with the average amount of territory tributary to his place of business, can find an outlet for all the energy and ambition that he is capable of putting forth in taking care of his share of the implement business, bearing always in mind that anything worth doing at all is worth doing well."

In combatting Russell's contentions and in seeking to prove that the automobile business is worth while, McRoberts did not "paint the lily." He showed that it is possible to lose money as well as make it, as is the case in all businesses.

He remarked that when the average dealer who sells automobiles goes to figure up his profits during the first year in business, he had better carry a shock-absorber in his pocket, as he is very liable to receive a shock. The dealer contemplating going into the automobile business should be very careful in the selection of his car. He must get a car that would stand up to the work and behind which the dealer could stand with his guarantee, otherwise the business would be a disappointment from the start. He didn't believe in getting into the business in a town in competition with one or more other dealers in the same town. He believed a dealer who intended engaging in the automobile business should plan to get a territory of at least a county, in which to have a chance to do business. His suggestion was that the dealer do not wait until prospects came to him, but that he get busy in advance. At this time of the year he thought it a good plan to write personal letters. He believed in getting in touch with the man who had the price to pay for a car, and by carefully following the matter up and keeping in touch with the prospect, the dealer would find when the buying season rolled around that he had a number of prospects in view. Then, when he made a sale, he explained to the purchaser his manner of handling replacements, told him whether certain parts would be replaced without charge, and what parts would be charged for. Also he explained the manner of handling the car, what parts to oil, how to clean it and care for it, in order that the owner might keep the car in the best possible condition. Then, when he came back after new parts in case of accident, there was a distinct understanding as to what he must buy and what would be replaced free under certain circumstances.

He believed a dealer should have a large territory in the automobile business. He should have at least a county, and then, by creating sub-agents, he could sell a great many more cars than could be sold direct through his personal efforts. That there was scarcely a county in the United States that would not take from thirty to forty cars. Dealers would find the expense of selling thirty machines would be little more than the expense of selling four, as the organization already was made up, and a man engaged in the machine business must keep his organization in working order the year around. Then he said that there was no use in going into the automobile business if you were going to eat up all your profits giving to the sub-agents or the customer a lot of parts or accessories. He said it was unnecessary to throw in carburetters or other parts, or oil or gasolene; that the purchasers would get these items free if they could, but it was unnecessary for the dealer to give them. That the margin of profit in automobiles was small enough at the best, without reducing it through giving away extra parts and equipment. He said that the profit in the automobile business for the retail dealer lay in the volume of trade. That a dealer might do a business of from $5,000 to $10,000 a year at a loss, but if he made such arrangements in buying his cars that he could increase this business to $40,000 or $50.000 he might find some profit in it. Then, if he could increase it to $80,000 or $90,000, he would find it a very profitable department of his business, as $80,000 or $90,000 of business could be done at no greater overhead expense that a business of from $40,000 to $50,000. It was in the volume that the profit lay, and unless the volume could be provided, he did not recommend dealers to engage in the automobile line. He said that they should reduce the overhead expense to the lowest point, and then, if the volume could not be increased enough to show a profit, he might as well give it up.

He said further that he did not know much about the automobile livery business, but did not regard it as profitable. He also said that dealers were liable to do too much demonstrating; that a prospective purchaser could be convinced with one or two demonstrations as well as with a dozen, and every demonstration cost money, and he thought sometimes the prospect was scared away when the dealer appeared too anxious to make the sale. In his opinion, the main thing was to get a good machine, and sell for cash. He also warned the dealers to keep the demonstrators in good running order. He said he had known cases where a prospect was lost because they had to fuss with the demonstrator before they could get the machine started. He said that nothing impressed a new enthusiast more than a car which was started easily and quickly. In regard to cash sales, he said that if the sale was not made for cash then it should be settled for with a bankable note; that a man who neither had the money nor the credit with which to pay practically cash for an automobile had no business owning one, and the dealer was not showing judgment in selling him. He believed in all cases any dealer could make money selling automobiles.

McRoberts remarks roused Russell sufficiently for him to call attention to the fact that it was the "average dealer" whom he referred to. He added there was no county in the State that couldn't stand thirty cars, or perhaps 100, but that in his county (Ramsey) there were twenty-three average dealers, and if each secured the county agency and each sold thiry cars, that would mean 690 cars for Ramsey County, and no county in North Dakota could stand it. He was still of the opinion that the average dealer, under the present selling plan, did not stand much show of making money. He said that if a firm had the county agency then they were practically in the automobile business exclusively, and could not be rightfully regarded as a part of the implement trade.

Mr. McRoberts replied that last year the automobile business of his company amounted to $60,000, and their machinery business to $180,000, so he figured he was entitled to believe that he had done some machinery business as well as some automobile business. He said that the position of his company was that the horse vehicle trade had been so greatly reduced in volume by the introduction of the motor car that they must have something to take its place, and that is why they were engaged in the automobile business. So far as his people were concerned, they considered it a profitable department, and he believed the average, active, intelligent dealer could do as well with the business as they had done.

To Prevent Motors Slopping Oil.

Motors built with packing glands around the valve tappets or other provisions to limit the escape of the oil from the crank chamber through the valve guides are in the minority. Where such provision is not made a slight amount of wear on either the tappet or the tappet guide will allow more or less free passage for the escape of the lubricant, and the maintenance of a clean motor is an utter impossibility. The remedy is simple. Remove the tappet and mount it in the lathe and cut a slot about midway between the top and bottom. From this circumferential slot cut a longitudinal slot to the base of the tappet. The oil will collect in the slot around the tappet and be returned to the base.

How Ignition May Form Carbon.

Accumulations of carbon have been blamed on lubricating oil, on gasolene and on carburation, but there is a strong probability that inefficient ignition is responsible for a great deal of carbon for which some other cause is thought to be responsible. A half-burned charge will make a deposit of carbon, and poor ignition will result in half-burned charges.

Wrong and Right Ways to Wash Tires.

A mistake that not infrequently is made is the washing of tires with a mixture of kerosene and water employed for washing the body of a car. This, the Michelin tire man warns, is anything but right, for, as most everyone knows, oil is death to rubber.

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Motorphobe Pays High for His Outburst.

The rural resident, who in many instances has an inherent hatred of automobiles, often makes himself exceedingly disagreeable toward motorists, and as a "road hog" and other types of animal, sometimes "gets away with it." The extent to which such motorphobes can carry their hatred recently was instanced in a court case, in which the man concerned paid a stiff price for a remarkable display of roadside temper. L. M. Carlyle, of Watertown, S. D., was the object of the judge's wrath. According to the testimony, Art Greer, a business man, was driving on a country road one dark night, when Carlyle turned his team across the road, threatened to horsewhip Greer, and further emphasized his feelings by drawing his knife and slashing one of Greer's tires, and then drove Greer from the car. In court, Carlyle pair $68.60 for his outburst. Carlyle's bitterness is said to have been the consequence of the frightening of a four-horse team he was driving by an automobile which he attempted to pass.

Shaky Tanks Make Leaky Joints.

A cause of leakage in the joints of the gasolene line that is of infrequent occurrence but sometimes is found where the tank is big and heavy and the piping stiff, is slight movement of the tank on rough roads, which causes the joints to "work" and gradually destroys their tightness. Gasolene will percolate through an extremely small aperture and it takes very little to start it dripping. It will pass quite readily through a crack that will not leak a drop of water.



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1,005,123. Attachment for Tire Inflating Pumps. Henry K. Austin, Reading, Mass. Filed Nov. 12, 1909. Serial No. 527,742.

1. The combination with a rigid tube having a nipple at one end adapted to frictionally engage the bore of a rubber tube, the other end of said rigid tube being provided with a flattened annular flange forming a seat, of an elastic terminal coupling plug bearing upon said seat and provided with a bore to receive the nipple of a tire valve, and a telescopic casing of sheet metal formed of members independent of said tube and inclosing said plug, one of said members engaging said flange, said members having overlapping portions engaging each other at a point intermediate the ends of said plug, whereby the casing may be contracted to press said plug against said seat.

1,005,149. Automatic Valve for Pneumatic Tires. Henry W. Brink and William M. Brink, Indianapolis, Ind. Filed Jan. 17, 1911. Serial No. 603,161.

1. The combination with a vehicle wheel provided with a pneumatic tire, of a pneumatic tire inflating device comprising a wheel hub, said hub being provided with an air outlet passageway having its mouth located in the face of the shoulder on said hub, a shoulder formed on said hub, a collar surrounding said hub and abutting the shoulder, said collar having an annularly extending air receiving groove in the end adjacent to the shoulder, said groove registering with the air outlet passageway in the hub with the tire, and means to hold said collar stationary.

1,005,171. Running Gear for Motor Vehicles. David M. Dearing, Jackson, Mich. Filed Nov. 12, 1909. Serial No. 527,624.

1. In a motor vehicle running gear, the combination of a supporting frame, a front axle, an upper connecting member on the under side of the frame, a lower connecting member having its central portion housed within said upper connecting member and its ends arranged over the ends of the axle, a sleeve inserted through the central portions of said members, to pivotally connect the same, cushioning devices arranged between said members at opposite sides of said sleeve, and springs arranged between the ends of the lower connecting member and the axle.

1,005,186. Transmission Mechanism. Henry Ford, Detroit, Mich. Filed Aug. 12, 1909. Serial No. 512,502.

1. In an automobile, a motor having a flywheel and a shaft with an extension beyond the flywheel, a transmission shaft in substantial alignment with the motor shaft, a sleeve journaled on the extension in nonrotatable engagement with the transmission shaft, a brake drum rotatable on the extension secured to the sleeve, a clutch adapted to lock the drum and extension together, and a change speed and reverse drive planetary train adapted to drive the brake drum and sleeve from the flywheel and extension.

1,005,201. Pneumatic Cushion for Vehicles. Caleb Stevens Gurney, Portsmouth, N. H. Filed Nov. 21, 1910. Serial No. 593,565.

A device for the purpose set forth comprising a cylinder closed at both its ends and provided in one side with upper and lower vertical series of lateral openings extending only part way to the ends of the cylinder, a piston slidably mounted in said cylinder, and valve plates secured to the upper and lower sides of the piston and fitting closely against the inner surface of the cylinder to alternately cover and uncover the lateral openings in the cylinder when the piston is reciprocated.

1,005,284. Spring Suspension for Motor Vehicles. Emil A. Nelson, Detroit, Mich. Filed Dec. 26, 1908. Serial No. 469,316.

1. In a spring support for vehicles, the combination of a semi-elliptic spring supported with its ends free to move outwardly, and springs for assisting the outward movement of the ends of said spring exerting a constant force upon said ends, in the direction of the length of said spring.

1,005,291. Friction Driving Mechanism for Motor Vehicles. Edwin G. Owen, Wysox, Pa. Filed Apr. 29, 1911. Serial No. 624,074.

1. A friction driving mechanism, comprising a drive wheel, a rocker having tubular arms, rods extending at one of their ends into said arms, springs secured to the inner ends of the arms, friction rollers carried by the outer ends of the arms and adapted to engage the periphery of the drive wheel, a drive shaft, and a gearing between the drive shaft and the rollers.

1,005,300. Carburetter. Burt Neulon Pierce, Indianapolis, Ind. Filed Jan. 3, 1910. Serial No. 536,200.

1. A carburetter including a mixing chamber with a main air inlet at one end and a gas outlet at the other end, a spring held wing valve in and extending transversely of said mixing chamber with the lower part thereof cut away to form a normal passageway thereunder for a current of air from the main air inlet, a fuel inlet entering the mixing chamber at the bottom thereof immediately behind the said wing valve, and a secondary air inlet in the bottom of said mixing chamber that is located immediately behind said fuel inlet.

1,005,306. Combined Signal and Sign-Displaying Lamp for Vehicles. Almor Manor Puckett, San Antonio, Tex. Filed Dec. 1, 1910. Serial No. 595,146.

1. In a device of the character described, a frame for holding and displaying individual interchangeable letter or number plates, comprising ends, top and bottom having parallel inwardly projecting flanges at their opposite front and rear edges forming longitudinal slideways for the plates the top being provided with an opening at one end to admit one plate at a time into the slideway, means for closing the opening, means for securing the closing means in place over the opening, and strips connecting the outside flanges of the top and bottom in position to cover the meeting edges of the plates.

1,005,326. Cushion Tire. Phillip Schau, Kalamazoo, Mich. Filed June 22, 1910. Serial No. 568,357.

A tire comprising a separable outer casing; a cushion member consisting of a band corresponding to the tread, conformed to said casing and having inwardly projecting cones thereon, the outer sides of the outer cones being conformed to the said casing; and an inner member corresponding to the rim having its edges conformed to the said outer casing and provided with annular grooves disposed to seat the inner free points of said cones.

1,005,332. Automobile Spring Tire. Niram A. Schneider, Mitchell, S. D. Filed Nov. 29, 1910. Serial No. 594,736.

1. A tire comprising a channel plate, bolts for securing said channel plate to a wheel rim, the head of each of said bolts provided with a central threaded socket and with a side socket, a resilient washer, a screw passing through said washer and within said threaded opening to hold said washer upon said bolt, a spring surrounding said head and having its end fitted within said side opening, a relatively larger spring surrounding said first mentioned spring, and secured to said channel plate, the tread portion resting upon said larger springs, and a casing surrounding said tread portion and adapted to be secured between said channel plate and the rim of a wheel.

1,005,362. Speed Regulator for Gas Engines. Albert H. Thomas, Springfield, O., assignor of one-third to Grant M. Smith and one-third to Charles W. Foster, Springfield, Ohio. Filed May 29, 1905. Serial No. 262,787.

1. A mechanism controlling the speed of an engine, comprising in combination with the flywheel, driving shaft and a sliding valve-operating rod, a bevel-ended spool splined to the driving shaft, a lever pivoted adjacent said driving shaft and adapted to engage at one end a lug on said rod and at the other end provided with a roller adapted to engage the beveled end of said spool, and a governor mechanism adapted upon the speeding up of the engine to throw said spool so as to permit the end of said lever to engage said lug on said rod.

1,005,386. Air Purifying Device for Internal Combustion Engines. Herman E. Whiting, Palmyra, N. Y., assignor to Garlock Auto Specialty Company, Palmyra, N. Y., a Corporation of New York. Filed May 4, 1910. Serial No. 559,293.

1. An air purifying device comprising a liquid receptacle having an outlet conduit, and a filtering element removably supported by said liquid receptacle and having an unrestricted discharge conduit extending therethrough and connecting with the conduit of the liquid receptacle above the liquid level of the latter.

1,005,449. Cushioning Device for Vehicles. Michael G. McGuire, Chicago, Ill. Filed Aug. 9, 1910, Serial No. 576,287. Renewed Aug. 10, 1911. Serial No. 643,402.

1. A cushioning device for vehicles comprising a pneumatic cushioning element surrounding and secured to the axle of the vehicle and with the air in contact with the axle, shoes secured to the upper and lower faces of said element, flexible connections on opposite sides of the element connecting said shoes, and means connecting one of the shoes with the springs of the vehicle.

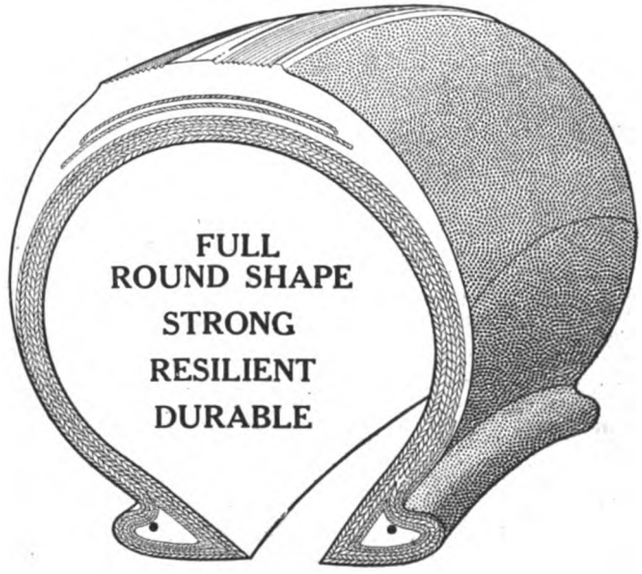
1,005,457. Internal Combustion Engine. Friedrich Oberhansli, Bregenz, Austria-Hungary. Filed Nov. 28, 1910. Serial No. 594,558.

1. In an internal combustion engine of the compressed air ignition type, the combination with the power cylinder of a combustion chamber at the end thereof, an atomizer nozzle arranged to open into the combustion chamber, a cut-off valve in the atomizer nozzle, a spring for normally holding the cut-off valve in closed position, a pump for forcing the liquid fuel through the atomizer nozzle past the cut-off valve, an overflow valve, an operating lever for the pump actuated from the engine shaft, a stud, an eccentric adjustably mounted on

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the stud, a regulating lever mounted on the eccentric and adapted to control the overflow valve, and a link connecting the regulating lever with the operating lever whereby the pump and the overflow valve are operated according to the speed of the engine substantially as described.

1,005,470. Tire. Charles L. Rempes, Akron, Ohio. Filed Aug. 16, 1910. Serial No. 577,468.

1. In a tire, the combination with an outer casing provided with annular ears and having inclined edges, of an integrally formed rib extending inward from the casing and having a flaring end adapted to be engaged between the inclined edges of the casing.

1,005,473. Elastic Wheel Bearing. Gustaf Rennerfelt, Scranton, Pa. Filed Feb. 4, 1907. Serial No. 355,592.

1. In a bearing, a pressure transmitting member, a track, a plurality of flexible hollow rollers, and another flexible roller within each of said flexible hollow rollers.

1,005,479. Lifting Jack. Herrman A. Schatz, Chappaqua, N. Y., assignor to Acme Ball Bearing Company, Chappaqua, N. Y., a Corporation of New York. Filed Jan. 17, 1908. Serial No. 411,315.

1. In a lifting jack, the combination with a standard, of a vertically disposed lifting screw, a worm wheel rigidly secured thereto, a lifting cylinder operated by said guard consisting in part of a rim attachable to said hand-piece, and absorbent material securing means in that portion of said guard that covers the working portion of said tool.

1,005,484. Carriage Fitting. Albert W. Smith, Providence, R. I., assignor, by mesne assignments, to The Columbia Motor Car Company, Hartford, Conn., a Corporation of Connecticut. Filed Dec. 2, 1907. Serial No. 404,871.

1. In combination, a plurality of bows or ribs for carriages, of spacers, interconnecting means for flexibly holding said spacers and for clamping them together with said bows.

1,005,491. Carburetter. Alfred Weiland, Philadelphia, Pa. Filed Jan. 21, 1909. Serial No. 473,406.

1. In a device of the character described, a main reservoir, a mixing chamber adjacent thereto, a fluid inlet to said reservoir, a mixture outlet from said mixing chamber, a throttle valve, an auxiliary reservoir having communication with said main reservoir, and said mixing chamber, a main air valve, means to supply a mixture of air and fluid to said mixture outlet when said main air valve is closed and means to simultaneously control said throttle valve and said air valve.

1,005,507. Starting and Reversing Mechanism for Multicylinder Internal Combustion Engines. Hans Theodor Bruns, Nuremburg, Germany. Filed Dec. 23, 1909. Serial No. 534,590.

1. Starting and reversing mechanism for multi-cylinder internal combustion engines, comprising a compressed air vessel, two distributing valves, operating members, a reversing member adapted to alternately actuate said operating members to operate either of the said distributing valves, a starting valve, conduits connecting the said distributing valves with the said starting valve and cams adapted to engage with said distributing valves respectively.

1,005,528. Automobile Jack. Joel B. Foster, Shelbina, Mo. Filed Jan. 31, 1911. Serial No. 605,837.

1. An automobile jack provided with supports for the power end of an automobile for sustaining the power end of the automobile in an elevated position, skids for the power wheels having the ends remote from those first receiving the wheels of the automobile adjacent the automobile supports and movable sustaining means for the second named ends of the skids responsive to the power wheels of the automobile for movement of the skids out of operative relation to the said wheels.

1,005,541. Engine Starting Apparatus. Edward A. Halbleib, Rochester, N. Y., assignor to Northeast Electric Company, Rochester, N. Y., a Corporation. Filed Dec. 16, 1910. Serial No. 597,732.

1. An engine starting device having, in combination, a manually operable member movable both longitudinally and rotatively, an air pump operated by the longitudinal movement of said member, a fuel-controlling device operated by the rotative movement of said member, and a mixing chamber into which the air pump and the fuel-controlling device discharge.

1,005,570. Governor. Lewis Riley O'Neill, Montclair, N. J. Filed Sept. 6, 1910. Serial No. 580,583.

1. In an explosion engine provided with a wheel having a hub thereon, a sleeve or collar on the hub and provided with a circumferential beveled face directed toward the wheel, transmitting mechanism connected to the beveled sleeve or collar and holding the same against rotation, a spring in engagement with the sleeve or collar at the end thereof remote from the beveled face, centrifugal members mounted on the wheel of the engine, and a beveled shoe on each centrifugal member having its beveled portion in operative relation to the beveled face of the sleeve or collar.

1,005,581. Valve. Alfred C. Stewart, Los Angeles, Cal. Filed Nov. 22, 1909. Serial No. 529,476.

In a valve, a sleeve having internal threads at its lower end adapted to be screwed onto a threaded valve stem, the upper end of said sleeve having a reduced threaded end for the attachment of an inflating tube and having an intermediate threaded portion, said sleeve being provided with an internal shoulder near its upper end and with an internal shoulder near its lower end, a thimble seated against the lower internal shoulder and forming a lower valve seat, the upper shoulder forming an upper valve in said first shell, a lift secured to said second shell having a recess in its upper face, an inflated rubber body inclosed by said two shells tending to move the same in opposite directions, and projections on said rubber body seated in said recesses.

1,005,589. Cushion Tire. Milton J. Altland, Dillsburg, Pa. Charles Altland administrator of said Milton J. Altland, deceased. Filed Mar. 12, 1910. Serial No. 548,840.

1. In a vehicle wheel, comprising a rim, an outwardly extending central portion secured to the rim, springs extending around said central portion and having laterally turned ends resting in a depressed portion of the rim to bring the outer face of the ends flush with the outer face of the rim, a covering for said springs and having laterally turned ends resting upon the outer face of the ends of the spring and rim, and means for securing the laterally turned ends of the covering on the rim.

1,005,690. Automobile Tire Pump. Frank E. Carlson, Chicago, Ill. Filed Oct. 24, 1910. Serial No. 588,711.

1. A tire pump comprising an air cylinder having an intake opening in its central portion, spaced pistons operating in said cylinder at each side of said opening, a ring surrounding said cylinder over said opening, said ring being grooved on its inner side and provided with an intake opening leading to said groove, and a wire gauze covering for the opening in said ring, substantially as described.

1,005,701. Internal Combustion Engine. Theodore E. Friend, Norwalk, Ohio. Filed Sept. 24, 1909. Serial No. 519,362.

1. In a four-cycle internal combustion engine, the combination of a cylinder, a piston reciprocable therein, a crank-shaft, a rod connecting piston with the crank, a case inclosing each crank and adjacent end of piston rod and communicating with the cylinder, thus forming a gas-tight chamber in which the piston rod and crank operate, a by-pass pipe communicating with such chamber and having a main inlet valve at one end and an outlet valve at the end adjacent to the top of the cylinder, means for operating such valves at the required times, as specified, an inlet valve and an exhaust valve arranged at the head of each cylinder, and means for operating such valves in the cycle or order of succession stated, whereby as the piston descends or makes its suction stroke, a charge is forced or transferred from the crank chamber into the upper or working chamber of the cylinder and whereby as the piston makes the first part of its return or compression stroke, a portion of the admitted charge is forced back out of the cylinder into the crank-case chamber, the inlet valve of the cylinder being closed during the latter portion of the compression stroke so that a complete charge is retained and compressed in the cylinder, a fresh supply of gas being admitted to the by-pass and crank case during such latter part of the compression stroke as shown and described.

1,005,707. Elestic Wheel for Motor Vehicles. William P. Hoopes, Milton, Pa. Filed Nov. 23, 1910. Serial No. 593,880.

In a pneumatic wheel of the character described, a bearing sleeve having an annular flange, a ring mounted slidably and non-rotatably upon the sleeve and co-operating with the flange to form a seat, said flange and ring having shouldered portions with faces disposed in parallel relation, a pneumatic tire occupying the seat and including a casing having flanges clamped between the opposed faces of the flange of the bearing sleeve and the ring slidable upon the latter, said tire being provided at intervals with outwardly extending lugs, a spoke ring supported upon the tire and provided at intervals with flanges between which the lugs of the tire are accommodated, a back plate, and a cap connected with the spoke ring and slidably engaging the seat flange and ring, and a cover plate secured upon the bearing sleeve and slidably engaging the back plate substantially in the manner and for the purpose set forth.

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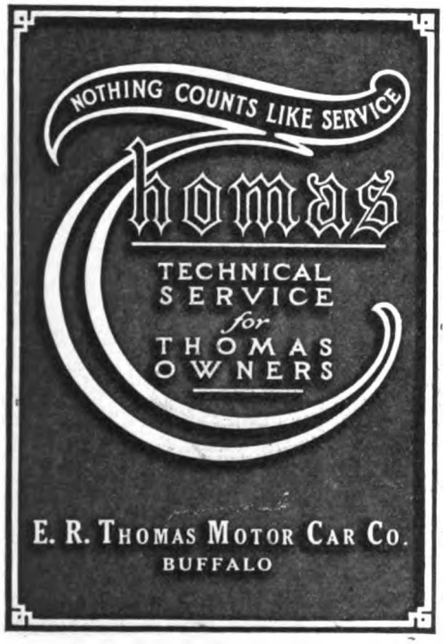
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366 Birnie Avenue, Springfield, Mass.

SAVE YOUR TIRES



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SAFETY TIRE GAUGE

PRICE $1.50 ALL DEALERS or by mail on receipt of Price and 6c. postage.

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Save Those Tires You can make your tires wear years instead of months—no tire troubles—no repair expenses—no delays. Free Book on request tells how you can get full motoring pleasure with

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Saving 90% of motor car up-keep costs—Dealers: 20% lower prices this year—and bigger discounts to you. Prepare to fill rush of orders.

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449 E. Market St., Akron, Ohio

"CONTINENTAL"



Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders
20 to 60 H. P.
Write for Booklets

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FACTORY REPRESENTATIVES:
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L. D. Bolton, ... 1810 Ford Bldg., Detroit

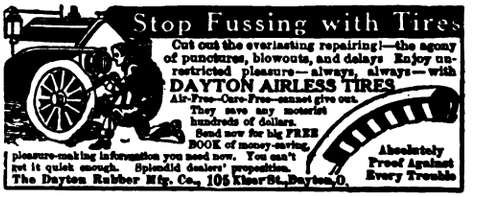
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Are you interested in Motorcycles or Bicycles, either from your present business connections, or from the memory of "days gone by"?

In either case you should have the 1912 Spring Number of

THE BICYCLING WORLD FOUNDED 1877 and MOTOCYCLE REVIEW

It's a complete Handbook of the cycling business and contains an immense amount of valuable information showing the progress of the industry and its condition today.

Among its leading features are the following:

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(2) A halftone of the president and sales manager of each American concern making motorcycles or bicycles, published with the idea of showing the "man behind" the machine, and the man with whom the dealer does business.

(3) Cycling track records—both motorcycle and bicycle—up to date of going to press, arranged in form convenient for quick reference.

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The Spring Number will be ready for mailing April 27th. Send your order at once—the supply won't last long.

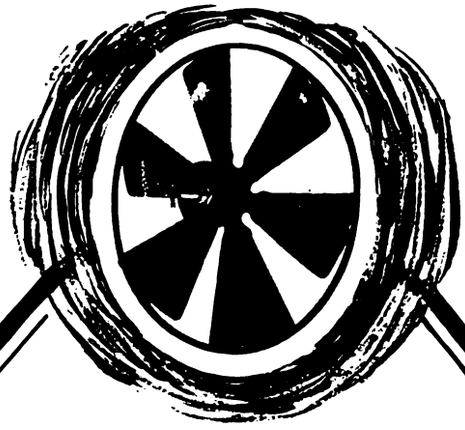
The price is 25 cents—BUT you need the cycling news every week, don't you? Then make your remittance $2.00 and you get the Spring Number and the next 51 issues.

THE BICYCLING WORLD COMPANY

1600 Broadway NEW YORK

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One Piece Blade Radiator Fan



2442

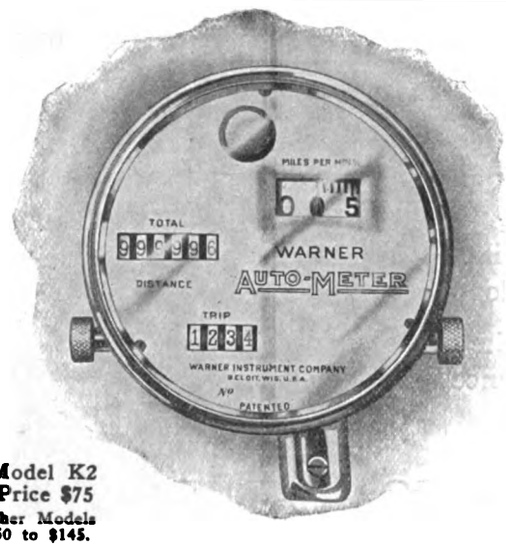
Cubic Feet of Air per Minute. Fan Diameter, 16"

Every Sparks-Withington Patented Fan is tested. You know before you buy what each different diameter will do. A completely equipped testing laboratory is maintained and our engineers are experimenting constantly. These tests will interest every fan purchaser.

You want a fan that will move a maximum volume of air and be durable. Sparks-Withington fans will do more for you than any other, and further, deliveries will be made when you want them.

Send for information or, shall we have our representative call?

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Model K2
Price $75
Other Models
$50 to $145.

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"The Aristocrat of Speed Indicators"

CONSISTENT Auto Manufacturers are equipping with the Warner Autometer. How can a car be truthfully advertised as thoroughly good throughout when the speed indicator is known to be cheap and inferior?

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MOON MOTOR CAR COMPANY OF NEW YORK
257 West 58th Street
(BROADWAY)
New York
TELEPHONE 8085 COLUMBUS

March 29th 1912.

Remy Electric Company,

Anderson, Ind.

Gentlemen:

During the past two and a half years approximately ninety per cent of the cars, which we have sold, have been equipped with Remy Ignition, and we take this opportunity of advising you that it gives us great pleasure to recommend, to our customers and agents, the Remy Magneto as equipment.

The attention your New York Service Department has given us, as well as our customers and agents, is highly commendable, and we wish to thank you for the many courtesies we have received.

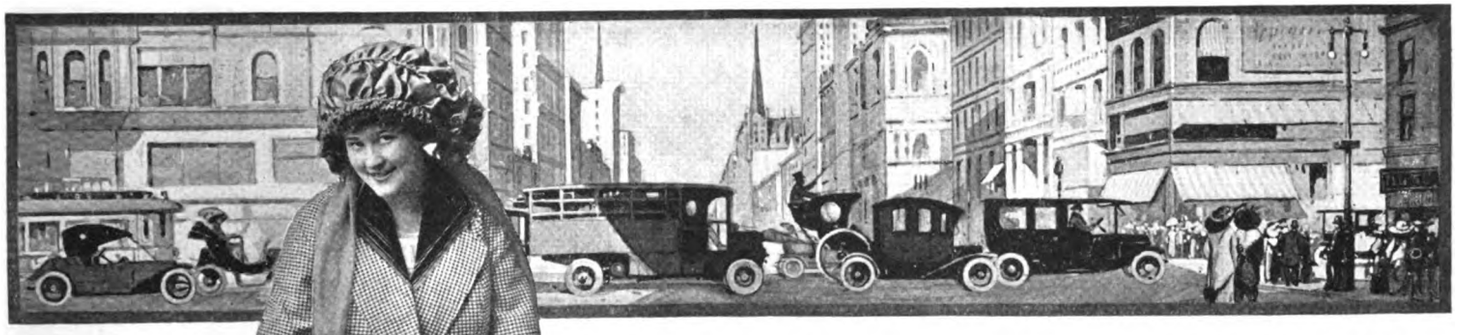
Very truly yours,

MOON MOTOR CAR CO. OF N. Y.

W. J. Pohlman
President.

A testimonial worth having
Copy of letter like this
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Kelly-Springfield Tire Company
20 Vesey St., New York

Branch Offices in
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Boss Rubber Co.
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Second hand experience is just as efficient and infinitely cheaper than first hand.

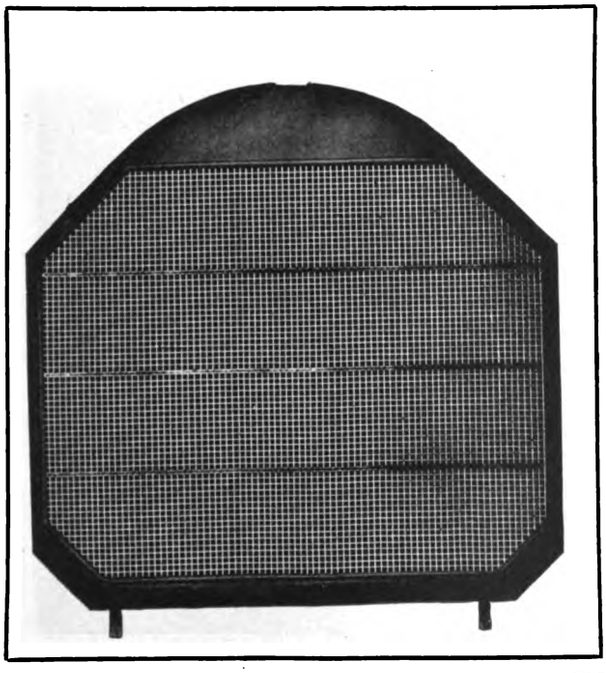
Take your tire experience from what others have learned at great expense on other tires, and get your tuition free. Get the **best** tires **first** by getting

Kelly-Springfield Automobile Tires

The name "Kelly-Springfield" on a tire stands for the same quality of rubber compound, the same tire-making experience, and the same care in manufacture, that have, for sixteen years, made the Kelly-Springfield solid vehicle tire the best of its kind.

Kelly-Springfield Tire Company, New York and Akron, Ohio

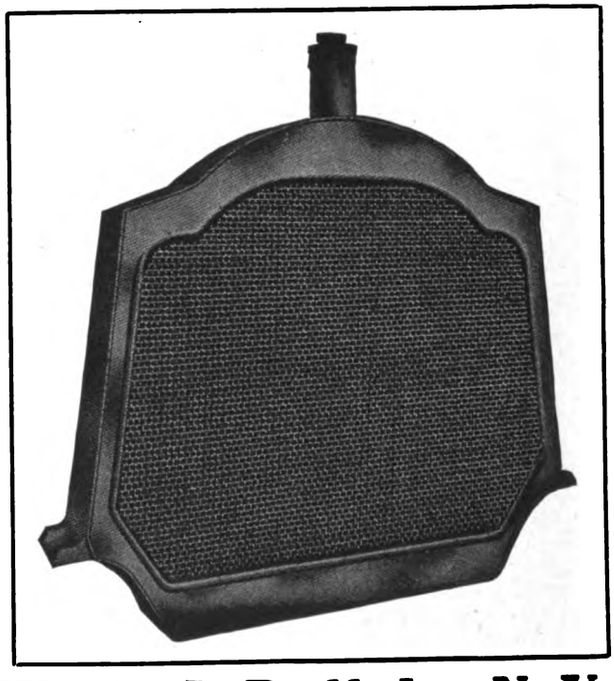
FEDDERS REAL SQUARE TUBE RADIATORS



No square tube "effect" or imitation, but made of individual square tubes. Of course the real square tube is better, that's why the others imitate it in appearance. They can't make the real article at the price.

Furnished with tubes staggered or Mercedes finish, as shown on cuts.

See Fedders Radiators on such cars as Packard, Thomas, Pierce, Haynes, Matheson, National, etc.



FEDDERS MANUFACTURING WORKS, Buffalo, N. Y.

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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

AJAX
TIRES
(Guaranteed 5000 Miles)

Strong Selling Talks for Ajax Dealers

In every Glidden Tour they have entered, Ajax Tires have always made the best showing. In the 1911 Glidden Tour all four of the trophy-winning cars had Ajax equipment, and not one of the sixteen casings had to be replaced during the whole rough trip of 1,454 miles.

Tires that make record trips like this and finish almost as good as new are the kind of tires dealers find profitable to handle. Ajax dealers report that tire business is always good with them.

Write for Ajax Inducements to Dealers.

AJAX-GRIEB RUBBER CO.
General Offices: 1796 Broadway, New York
Factories: Trenton, N. J.

Branches in Principal Cities

The Hotel of Comfort **The WOODSTOCK**

"You can walk from there to anywhere"

Our new addition is ready for occupancy.
We now have 360 rooms with 265 baths.
Write us for descriptive folder with typical floor plan and rate card.
Wire for reservation at our expense.



RATES

Court room with bath, for one, per day.....$2.50
Court room with bath, for two, per day..... 3.50
Outside room with bath for one, per day..... 3.00
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Outside room with twin beds, for two, per day $4.00

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127 W. 43d St.
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W. H. Valiquette, Manager.

Also
"THE BERWICK"
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Miller's Pan-American TIRE SAVER



WHAT IT DOES:

Repairs Punctured Inner Tubes. Fills Cuts in Tire Casings, and Repairs Blow-Outs Without Vulcanizing. Increases Tire Mileage.

Consists as illustrated above of:
One Can Pan-American Rubber Cement.
One Can Pan-American Rubber Putty.
One Pan-American Tire Plaster.
One Piece High Grade Emery Cloth.
Packed in neat screw top Carton.

Price, Complete with Directions $1.00

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES
"The Pioneer"—Established 1896

Chas. E. Miller

MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

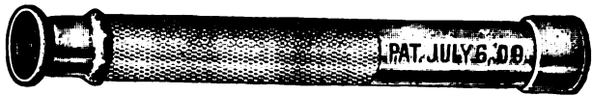
HOME OFFICE

97-99-101-103 Reade St., New York City

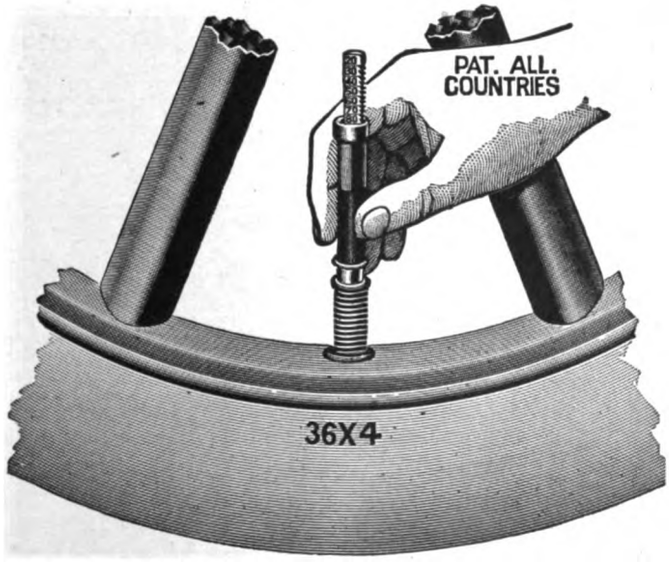
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BROOKLYN, N. Y.—1421 Bedford Ave. PHILADELPHIA, PA.—318 North Broad St.
BUFFALO, N. Y.—824 Main St. ATLANTA, GA.—66 Edgewood Ave.
ALBANY, N. Y.—135 Central Ave. NEW ORLEANS, LA.—601-603 Barrone St.
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Announcement



TWITCHELL AIR GAUGE



The Twitchell Gauge Co. have succeeded the Twitchell-Garvey Mfg. Co. and will in the future market the Twitchell Tire Pressure Gauges.

All patents, rights, etc., including the Twitchell trade name, have been taken over by this firm. Our rights and yours will be vigorously protected under Twitchell patent No. 927,298, which has been repeatedly adjudicated as valid by the courts.

The fine quality of workmanship and accuracy which has distinguished the Twitchell Gauges in the past will be maintained in the future, and this Gauge with the new stop feature, which has been perfected by Mr. Twitchell, is now ready for the market and will thus continue to be the leading Tire Pressure Gauge, as it has been since it first was put on the market.

Mr. Fred G. Bremer has succeeded Mr. James Garvey as manager of this firm.

THE TWITCHELL GAUGE CO.
1256 Michigan Ave. CHICAGO, ILL.

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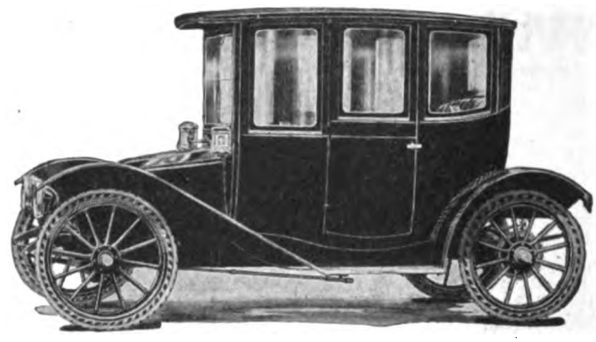
Argo Style Means Efficiency

There is good good mechanical reason for almost every striking feature of the ARGO Brougham.

The long wheel base, low swung body and large wheels may at first seem only intended to add grace and beauty of line. They do that—and more.

The silent chainless enclosed power plant appeals first to the demand for a dignified noiseless pleasure car, but our engineers designed it also for long life—for economy of power—for efficiency.

Underneath the solid comfort and elegant luxury of the ARGO is a foundation of sound scientific principles. We shall be glad to tell you more of the ARGO policy if you will but say so. Write for our booklet.



ARGO ELECTRIC VEHICLE CO.

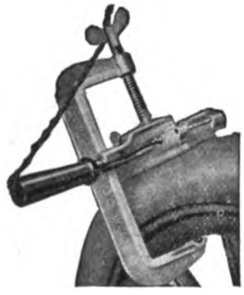
1201 S. Jefferson Avenue SAGINAW, MICH.

AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both.

Before a customer kicks about tire trouble

tell him how a reliable vulcanizer will help him avoid it. Show him that sealing stone-cuts and sand-pockets with welds of new rubber will make tires give double or treble their usual service. Prove to him that he or his chauffuer can vulcanize tubes and casings at home. Then sell him a

SHALER Vulcanizer



Most motorists know the Shaler by reputation and will buy their vulcanizers from the local dealer who is ready to supply them. Other motorists will buy as soon as they see how well their neighbors are satisfied.

Models for every requirement—heated by electricity, steam, or by direct radiation—have the exclusive Shaler feature, a thermostat to control the heat automatically. Can not injure a tire.

Write today for dealers' proposition.

C. A. SHALER CO.

405 Fourth St. Waupun, Wis.

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PUCK BUILDING

295-309 LAFAYETTE ST. COR. HOUSTON

NEW YORK

TELEPHONE 81 SPRING

ESTABLISHED 1871

Buy "Kline Kars First Because Kline Kars Last"

The first American car to adopt the FOUR SPEED FORWARD TRANSMISSION at a price lower than the regular three speed ones acknowledged high grade.

NOTE—All high priced cars have it. WHY? Because it saves fuel, operates easier and makes hill climbing a pleasure on direct drive. INVESTIGATE.

Four and Six Cylinder Models; Prices $1750 to $3500

Self Starter—AGENTS GET OUR PROPOSITION—Address:

KLINE MOTOR CAR CORPORATION, York, Pa.

Factories—York, Pa.; Richmond, Va.

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Who and what does

M & P ELECTRIC VEHICLES · DETROIT ·

stand for?

Briefly it stands for highly specialized knowledge in Truck design, construction and services. It stands for a union of extensive experience in the Building and Selling of both gasoline and electric cars. It stands for a "make good" Truck.

M stands for M. C. **Merriman,** Treasurer and Sales Manager. Has had long experience as automobile Dealer and salesman of gasoline and electric cars for pleasure and commercial use. In direct contact with the Trade, he made a special study of the commercial car situation. The result of this is shown in the simplicity, accessibility, high quality and moderate price of the "M & P" Electric.

P stands for Chas. **Pepper,** President and General Manager of the M & P Electric Vehicle Company. For past four years was Superintendent of the Truck Division of the Packard Motor Car Company, Detroit. For six years was General Manager for the Waverley Electric Company, builders of electric vehicles. Has been identified with the Automobile industry since its inception. A man of ripe practical experience. A man with first hand mechanical knowledge of every detail essential for the building of a high class practical product.

These two men backed by ample capital, in a plant with modern facilities are building

The M & P 1000 Lb. Electric Truck

The first high quality electric truck at a popular price.

Every day the tide of popular opinion is sweeping further toward the electric truck as the final and correct solution of the delivery problem.

DEALERS—Write at once and get full information on the livest proposition of the year. First come, first served. Deliveries are being made now.

M & P Electric Vehicle Company

Franklin and Dubois Sts. DETROIT, MICHIGAN

BOSCH

Magnetos and Plugs

OVER a million Bosch users know magnetos to be the most efficient and reliable of ignition systems. Why chance others?

If it's good for a million
It's good for you.

BOSCH MAGNETO COMPANY

223-225 West 46th Street NEW YORK

Detroit Chicago San Francisco Toronto



YOU DO

want a smooth-running motor, don't you?

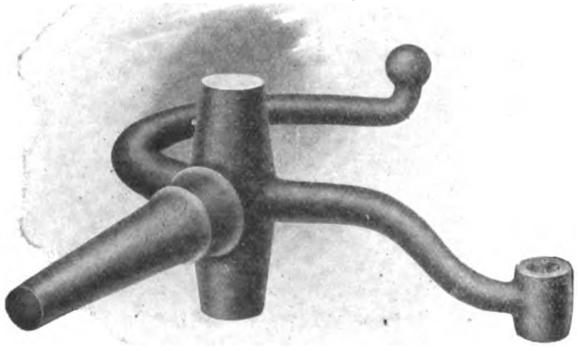
Equip your motor with a set of "AC STAR" spark plugs and you will be able to run at top speed and throttle down with no danger of back-firing, as the superior design of "AC STAR" plugs prevents pre-ignition.

Send for Booklet

CHAMPION IGNITION COMPANY

FLINT, MICHIGAN

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PIONEERS
in making and treating

Drop Hammer Forgings

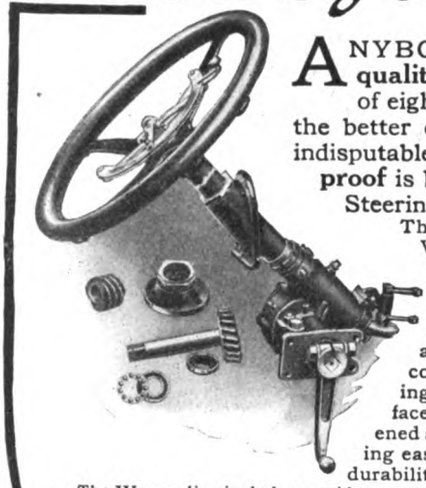
We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

Warner Quality
Steering Gears



ANYBODY can claim quality—but a record of eight years use on the better class of cars is indisputable proof. That proof is back of Warner Steering Gears.

The prime features of Warner Gears are: accessibility; complete interchangeability; use of eccentric sleeves; adjustable angle of column; large bearing and contact surfaces specially hardened and ground, assuring ease of motion and durability.

The Warner line includes a wide range in both pleasure and commercial types.

We guarantee dependable deliveries.

Get acquainted with Warner Quality—make it another selling argument.

We modify our designs to meet your detail requirements, or build on approved designs on seasons quantity specifications.

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Warner Gear Co.
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R-C-H "Twenty-Five"

Five Passenger Touring Car

Model SS $950 Self-starter and other special equipment.

Standard Model $850 Fully equipped, but without self-starter and other special equipment.

HUPP-YEATS ELECTRIC COACH

"The first advance in coach-making in over a century."

Six models—$1750 to 5000

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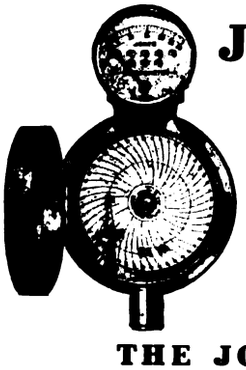


The superiority of

Schafer Ball Bearings

is conclusively proven by the fact that they are used in the leading cars throughout the world.

BARTHEL, DALY & MILLER
42 Broadway NEW YORK CITY



JONES RECORDER

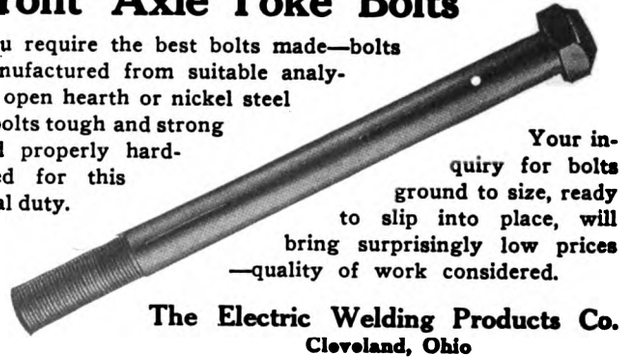
Gives time, speed and distance. Number of stops—length of each stop. Complete record of every movement or stop of vehicle marked on chart. Absolutely essential to all operators of motor trucks or delivery wagons.

The Jones Recorder consists of a strong brass casing, containing a clock work and flexible shaft from the drive wheel of the vehicle.

THE JONES RECORDER
Broadway and 76th Street **New York**

Front Axle Yoke Bolts

You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel—bolts tough and strong and properly hardened for this vital duty.



Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

The Electric Welding Products Co.
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Converted the Industry

BE not misled—it was the Winton Six, single-handed and alone, that converted the automobile industry from four to six cylinders. It took us four years to convert some makers. But we could only supply the proof of Six Superiority; some men are slower than others to see the light.

Shall we send you a catalog?

THE WINTON MOTOR CAR. CO.

426 Berea Road Cleveland, O.

Ford

The Car of Vanadium Steel

The car which has won deserved popularity by reason of established merit.

Send for catalog and other descriptive literature.

FORD MOTOR COMPANY

Detroit, Mich., U. S. A.

National 40

Stock Champion **Road Race Champion**



Five Passenger Touring Car, Series V, $2,900

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Speedwell

A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.

DAYTON, OHIO.

Touring Car
7-Passenger
$2,900
Fully Equipped including Self-Starter

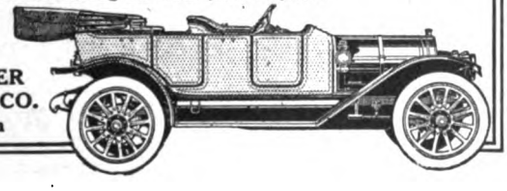


Cutting CARS

Get Posted

See our free Table of Comparative Motor Car Values—It will make you a posted purchaser and enable you to form an estimate in your selection of a car that is conservatively the most for the money. **Cutting cars cost less per Horsepower and per Wheel Base Inch than any other automobile selling for $1200 or more.** In point of design, workmanship and finish they are equal, and in some cases superior, to cars selling for from $3000 to $4000.

The Cutting catalog mailed anywhere on request.



CLARKE-CARTER AUTOMOBILE CO.
Jackson, Michigan

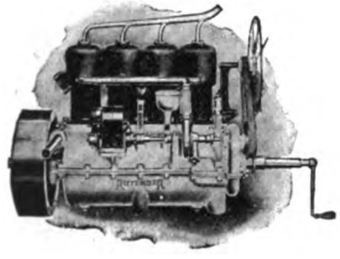
If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

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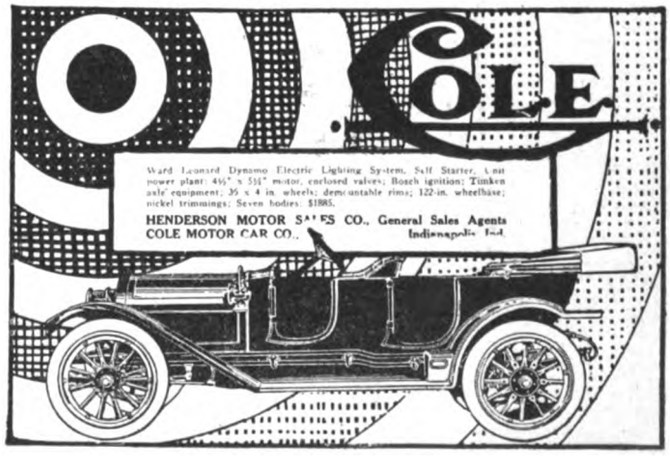
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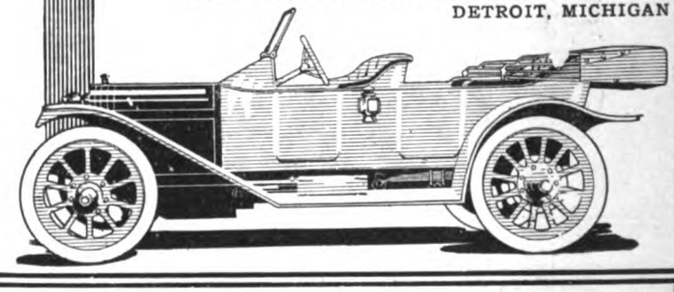
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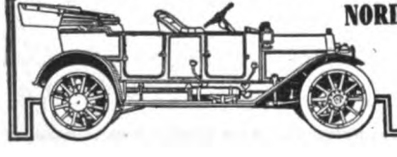


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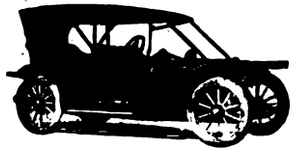
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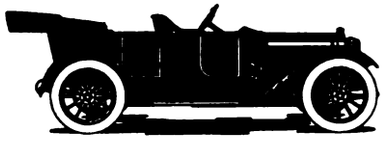
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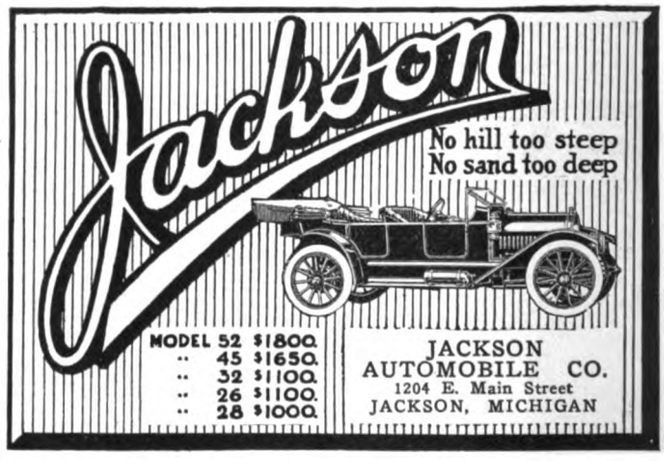
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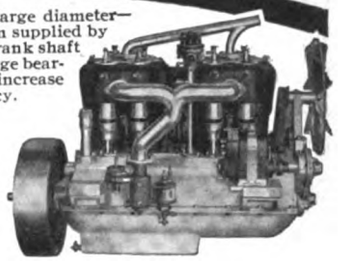
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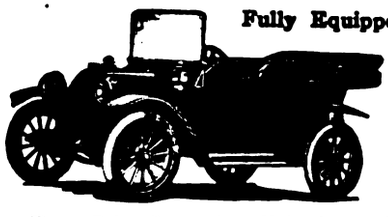
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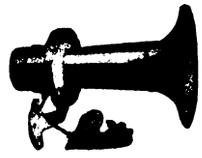
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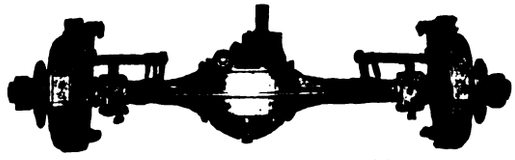
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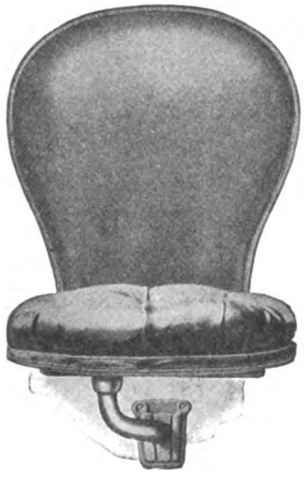
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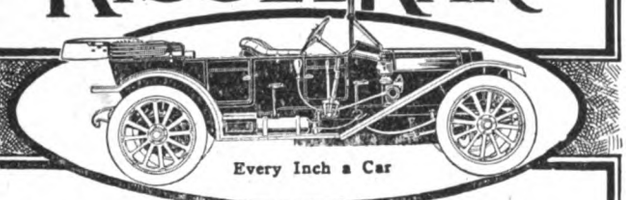
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Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

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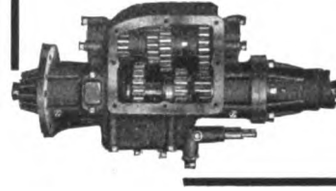
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Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

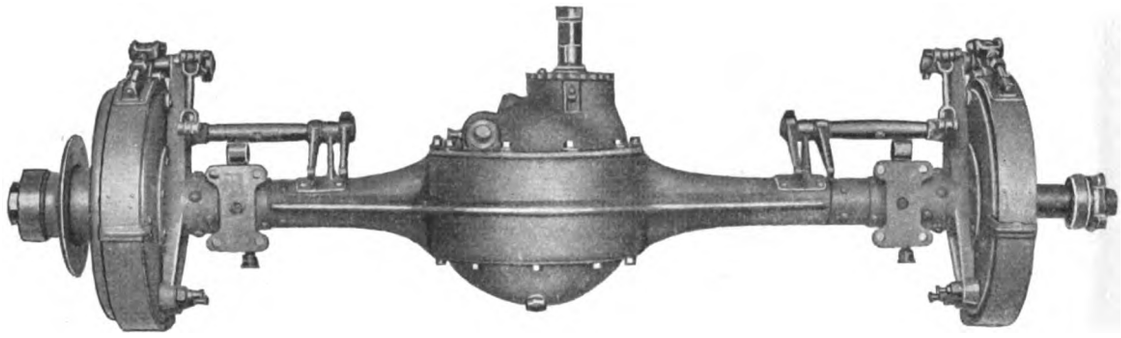
1440 North American Building
Philadelphia

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American

American Axles

American

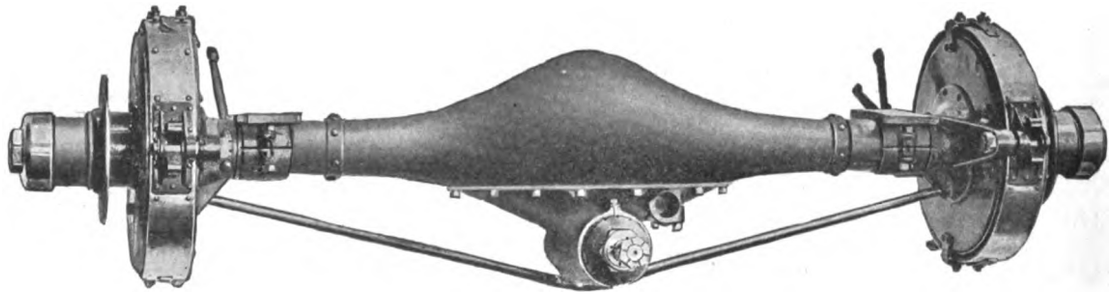


Whether it be a bevel or worm drive rear axle, the *American* should hold first place both in the mind of the manufacturer and the man who contemplates buying a car.

The fact that we built and successfully introduced the first bevel drive type of rear axle in America and now lead in the production of the worm drive type, in itself proves our superiority.

American Axles both bevel and worm drive, can be furnished for cars weighing up to 4500 lbs. and to 60 horsepower.

The worm and bevel in all cases are mounted on annular ball bearings of ample size with proper thrust bearings. Hubs can be equipped with annular or taper roller type bearings, as may be specified.

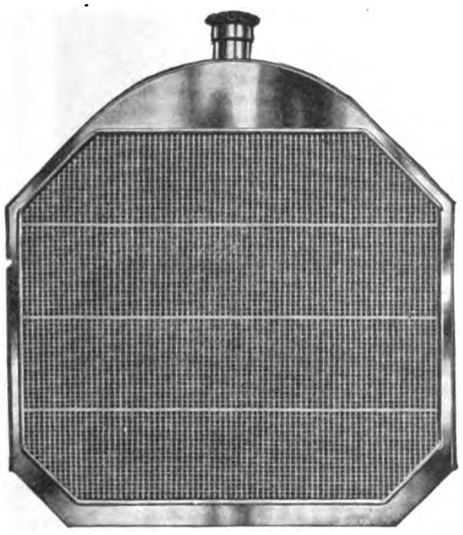


THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. **CLEVELAND, OHIO**

American

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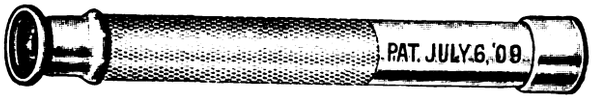
The Mayo—the radiator thoroughbred

¶The Mayo Radiator "makes good" because it is made good.

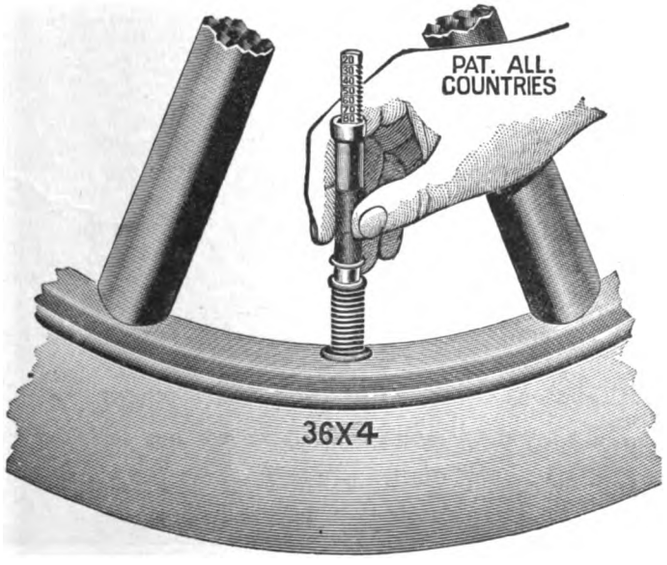
WRITE FOR LITERATURE

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

Announcement



TWITCHELL AIR GAUGE



The Twitchell Gauge Co. have succeeded the Twitchell-Garvey Mfg. Co. and will in the future market the Twitchell Tire Pressure Gauges.

All patents, rights, etc., including the Twitchell trade name, have been taken over by this firm. Our rights and yours will be vigorously protected under Twitchell patent No. 927,298, which has been repeatedly adjudicated as valid by the courts.

The fine quality of workmanship and accuracy which has distinguished the Twitchell Gauges in the past will be maintained in the future, and this Gauge with the new stop feature, which has been perfected by Mr. Twitchell, is now ready for the market and will thus continue to be the leading Tire Pressure Gauge, as it has been since it first was put on the market.

Mr. Fred G. Bremer has succeeded Mr. James Garvey as manager of this firm.

THE TWITCHELL GAUGE CO.
1256 Michigan Ave. CHICAGO, ILL.

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One Look Tells Everything

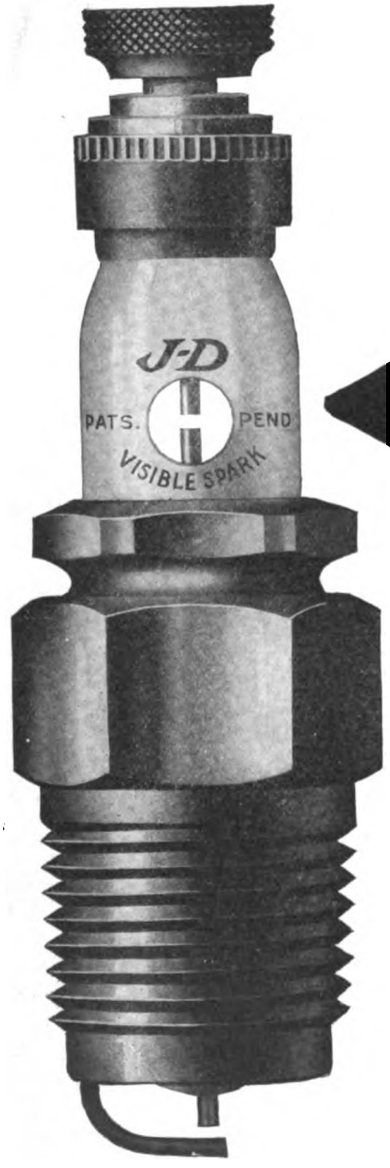
The JEFFERY-DEWITT CO. DETROIT, MICH. Visible Spark Plug lays bare all ignition trouble

The "visible gap" is an open "window" giving you a full view of the internal workings of your spark plug.

If the spark is seen jumping the gap, look for your trouble between the gap and sparking point.

If there is no spark in the gap, your trouble is behind the plug—in Magneto, or batteries, or coil, or wiring.

But for the "visible gap" it would take you many precious minutes—often hours—to locate the seat of trouble.



$1.00 Buys this great new Spark Plug

Indicates in which direction trouble lies.
Facilitates timing of engine.
Intensifies spark in cylinders.
Consumes only minimum current.
Gap ajdustable—can be closed entirely.
By widening gap plug cleans itself.
Permits regulating spark for any cylinder.
Costs same as any good plug—$1.00.

Dealers will find J. D. Visible in greatest demand

Visible Idea Worked Out Perfectly for the First Time

The "visible gap" feature, so far as being incorporated in a plug, has always seemed as far away as perpetual motion. The visible feature has been marketed in a separate device for years, but this is the only plug embodying the visible feature in a practical manner.

It is simple. Merely a hole in the porcelain and a spiral action to regulate length of gap in the central electrode which carries the current.

The hole in no way lessens the strength of the plug, and the current in jumping the "visible gap" loses none of its efficiency. On the other hand it intensifies the spark at the gap in the cylinder.

Additional prestige is lent the J. D. Visible Spark Plug by the fact that it is being introduced by the largest manufacturers of spark plugs in the world. We are exclusively manufacturers of spark plugs; we make millions of them each year.

The J. D. Spark Plug was a famous plug before it was improved by the visible feature. It combines finest workmanship, best materials and simplest designs.

Every part of this plug is made in our factory—even the porcelain being produced in our own potteries from clays and other ingredients imported from Europe.

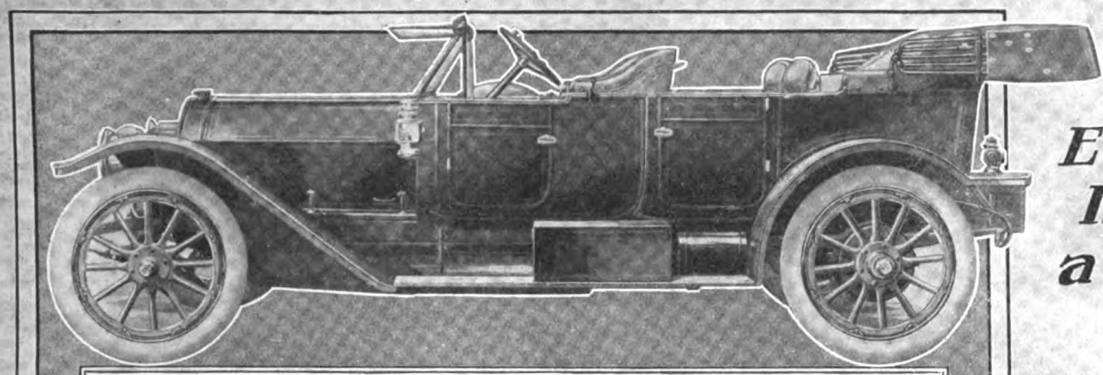
This unequivocal guarantee goes with all our spark plugs:

"Your money back or a new plug if you are not satisfied"

If your dealer hasn't the J. D. Visible yet, send your money direct to us for a set, and we will ship them postpaid. Remember, the J. D. Visible Plug is only $1.00. Write today for our literature on ignition. It is free.

Jeffery-Dewitt Company, 565 Butler Ave., Detroit, Mich.

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Every Inch a Car

Service centers dot America

KISSELKAR SERVICE brings every KisselKar owner into close relationship with the manufacturer. Specially constructed and equipped buildings are maintained at principal points as service centers. In co-operation with their regular agencies, they extend to KisselKar owners the complete service that intensifies satisfaction in the KisselKar, minimizes up-keep and depreciation.

"Thirty" $1500—"Forty" $1850
"Fifty" $2350—60 H.P. "Six" $3000

KisselKar prices, except on the "Thirty" include full equipment—top, windshield, detachable rims, shock absorbers, lamps, tanks, speedometers, etc.—nothing left to be bought separately. "Thirty" has more than regular equipment.

1½ to 2, 3, 4, 5 ton Trucks, Delivery Wagons, etc.

The KisselKar line of commercial vehicles is one of the most comprehensive, carefully designed commercial lines built, furnishing right sizes for cost-saving haulage and delivery under all conditions.

Write for catalog describing entire KisselKar line.

Kissel Motor Car Company
159 Kissel Ave., Hartford, Wis.

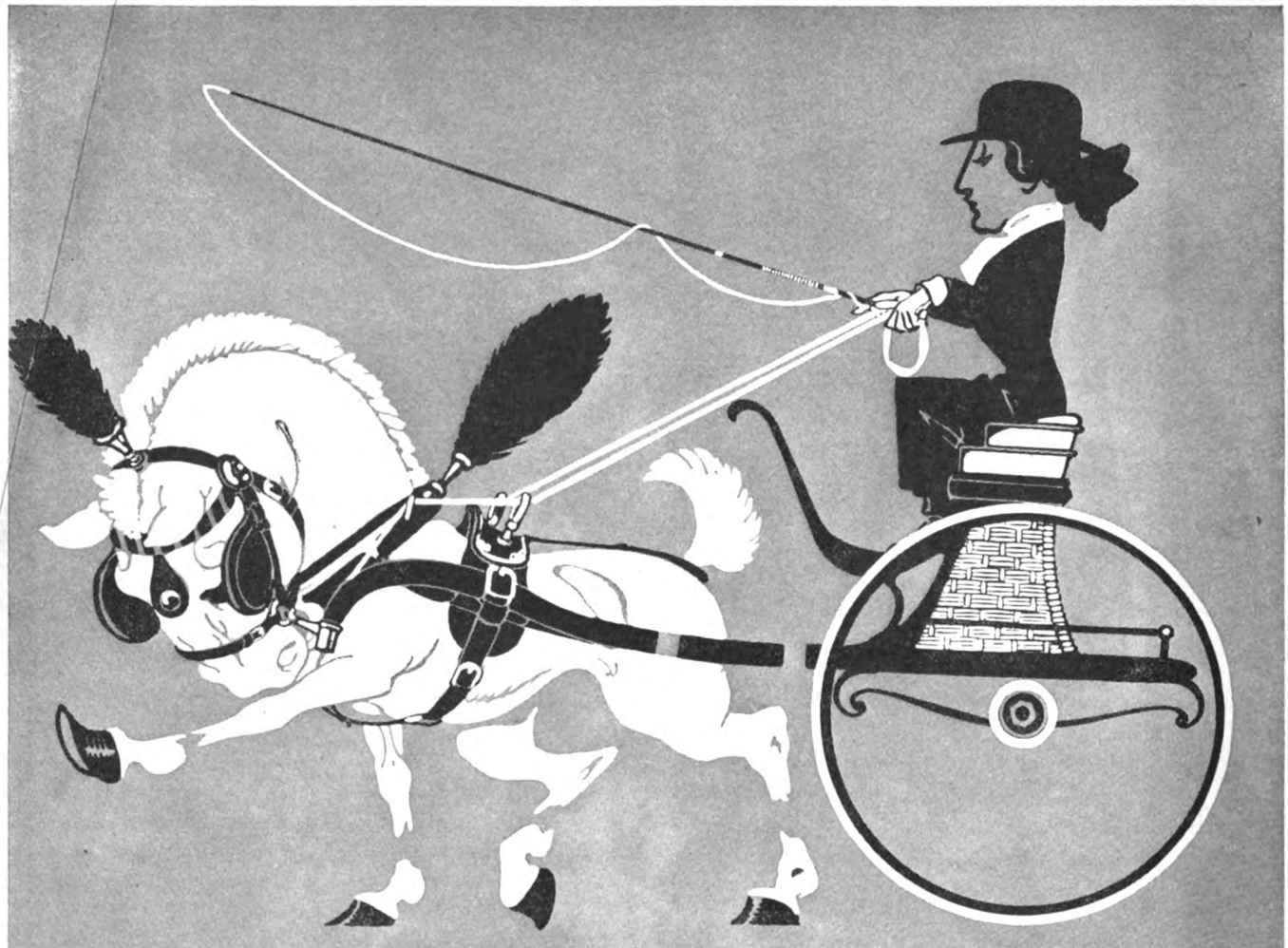
Some of the KisselKar Branches and Distributors

New York
Chicago
Boston
Milwaukee
Kansas City
Los Angeles
Minneapolis

Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, Seattle, San Francisco, Portland, Duluth, Buffalo, Pittsburg, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

KISSELKAR

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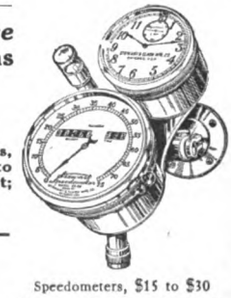
Not Built for Show

The Stewart Speedometer is *not* built for *show;* it's built to show how *fast* you *go.* It's never *fast* and never *slow;* it never misses a second to the hour nor an inch to the mile.

If we spent a million dollars on each Stewart Speedometer we couldn't make a more *workmanlike* instrument. The added expenditure would all go for fol-de-rols and frou-frous. We could diamond-stud the *dial*—we could gold-plate the *hands* and emblazon the *case* with sapphires, but for all the *extra* you'd pay you'd only get *display.*

The Stewart Speedometer is the most *accurate*—the most *reliable*—the most *durable* speed measure that can be made. If you give *more* for any other speedometer, you get *less.* A higher price means *"front"*—not *value.*

Not an *aristocrat*—it *works.*



Magnetic principle; jewel bearings; wearing parts hardened and polished; open dial; large figures, easily read; absolutely accurate; 100,000-mile season odometer; 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft; drop forged swivel joint; noiseless gears.

"ALWAYS ON THE JOB"

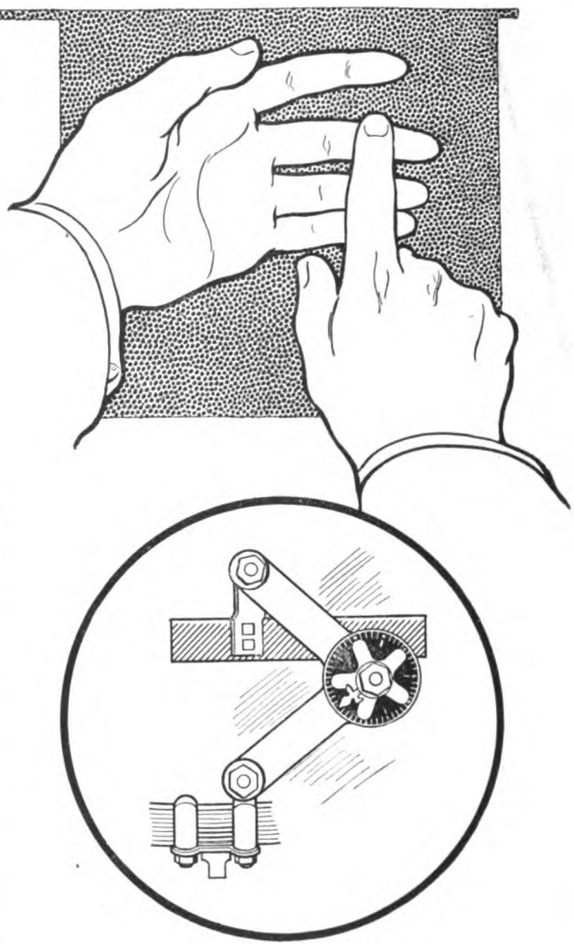
STEWART & CLARK MANUFACTURING CO.
1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston Kansas City
Cleveland Philadelphia Minneapolis Indianapolis London Paris

Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

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Hartford Pointers—No. 3
Reduced Depreciation—and Easy Riding



WHY is it that often one car will command a far better price on second sale than another of the same make and model—even though the first has seen longer and more severe service?

Better care—there's the reason.

No factor is more destructive to the motor and mechanism than the ravaging jolt, jar and vibration incurred on rough, tortuous roads.

You cannot avoid rough roads and get anywhere, but you *can* avoid the jolt, jar and vibration. And in so doing, you are materially adding to the life of the whole car and to its market value. The

Truffault-Hartford SHOCK ABSORBER

points the way. Experts declare that it reduces depreciation 50%. This alone should commend its use to every prudent car owner. But there are further advantages in using this equipment—advantages in comfort, safety and economical up-keep—advantages of enough consequence to more than double the pleasure of motoring and effect a large reduction in up-keep costs.

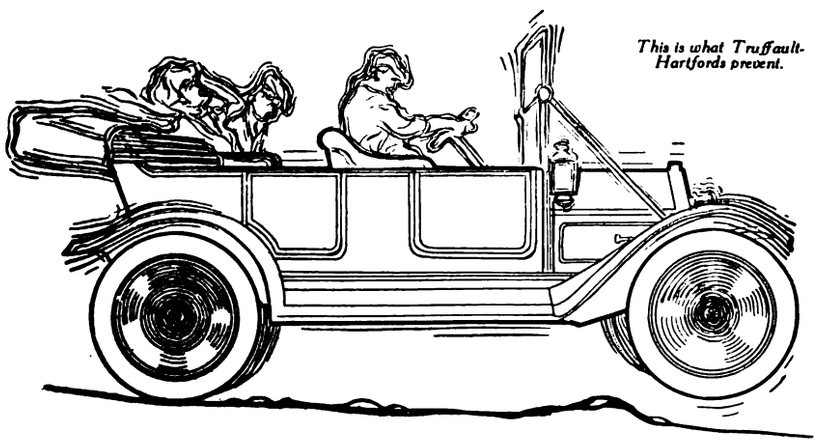
The spring plays a very important part in the performance of the car. If allowed to operate without proper restraint, it acts violently. It isn't natural that your car should pound down on its axles when it encounters a road obstruction, then rebound with distressing fury. Nor is it reasonable that the tires, engine and frame can long endure this abuse. The logical thing to do is to provide against it, and the one logical provision is the Truffault-Hartford Shock Absorber—the only device exercising *proper* control over spring action.

Proper control, in brief, means this—a steady, constant frictional resistance to *both* the contraction and expansion of the spring—enough resistance to always keep the spring within its normal working limits, but *not* enough to interfere with the *full play* that is necessary to secure easy riding.

This exclusive feature of the Truffault-Hartford accounts for its ability to completely absorb all road shocks without detracting from the flexibility of the spring. It is the reason for its efficiency in preventing spring breakage—in reducing tire, up-keep cost, and depreciation by one-half—and in making your car sumptuously easy to ride in on all kinds of roads.

Twenty-four leading automobile manufacturers equip every car they produce with the Truffault-Hartford.

Four Models—$60, $45, $25, $15.



This is what Truffault-Hartfords prevent.

Your dealer will be glad to tell you more about the Truffault-Hartford—and our new catalogue will also acquaint you with its many additional features. Write for it today.

The Hartford Suspension Co.
E. V. HARTFORD, Pres.
164 Bay Street Jersey City, N. J.

BRANCHES

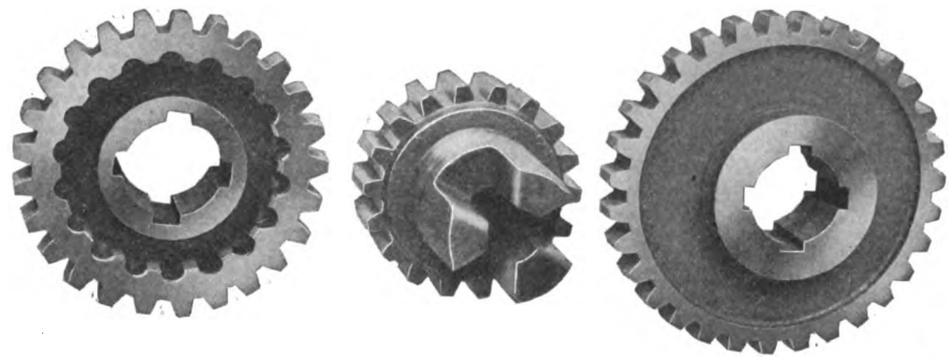
NEW YORK - 1700 Broadway and 212-214 West 88th St.
BOSTON - - - 325 Columbus Avenue
PHILADELPHIA - - - 1437 Vine Street
CHICAGO - - - 1458 Michigan Avenue
NEWARK - - - - 239 Halsey Street
KANSAS CITY, MO. - - 1524 Grand Avenue
DETROIT - - - 870 Woodward Avenue

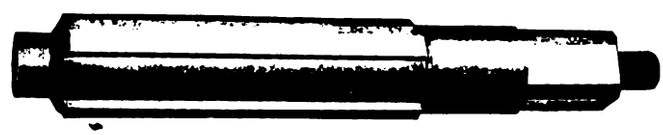
15 Years "Weeding Out" the Inefficient.

Since 1897 when we conceived the idea of the shock absorber (six years before the device was presented to the public at large) we have "weeded out" by costly experimenting, year after year, numerous other devices, including the *wedge*, *cam*, hydraulic, air-cylinder, strap, spring, spiral spring and spring cylinder, etc. We have proved conclusively—that, so far at least, no other principle than rotary friction has come anywhere near to solving the shock absorber problem and this is mentioned that the public may take advantage of the knowledge gained at great expense during a period of 15 years.

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GRANT-LEES





GEARS

Transmission
Differentials
Worm and Worms
and Our
Famous Helical Gears

Pioneer Helical Gear Makers of America

Grant-Lees Machine Co.

CLEVELAND, OHIO

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Free Yourself From the Troubles and Expenses of Unprotected Tires

STOP the troubles before they come—save your money and enjoy your motoring. Never again need a puncture or any other tire trouble ever turn an auto ride of yours into a roadway experience of bitter exasperation and grimy repair toil. Get this tire protection—proved by thousands of motorists who have kept their tires good as new after more than two years continual service on the worst of roads with

Standard Tire Protectors

Rubber and fabric have been demonstrated the only practical meterials for tire protection. In Standard Tire Protectors the toughest rubber ever produced and the hardest woven fabric give your tires protection that protects against every form of tire injury—almost like armor plate around your tires.

Reduced prices—average 20 per cent lower than last year on all popular sizes—a further economy gained for you by our new manufacturing advantages, now remove the last reason for you to delay giving your tires this protection. And if desired, you may have our famous non-skid tread instead of plain tread. You get skidding protection in addition to tire protection—both at the cost of one.

Standard Tire Protectors may be had in all regular sizes—to fit any tires. They are easily applied in just a few minutes—and are held on tight and fast simply by inflation pressure No mechanical attachments. Sand or gravel cannot get between the Protector and the tire.

Free Book on Tire Protection

will be sent you on request. It contains much valuable information, and proves the way for you to save ninety per cent of your motor car up-keep costs. Write for this free book now.



Dealers — Greater Discounts to You with Lower Prices to Users for 1912

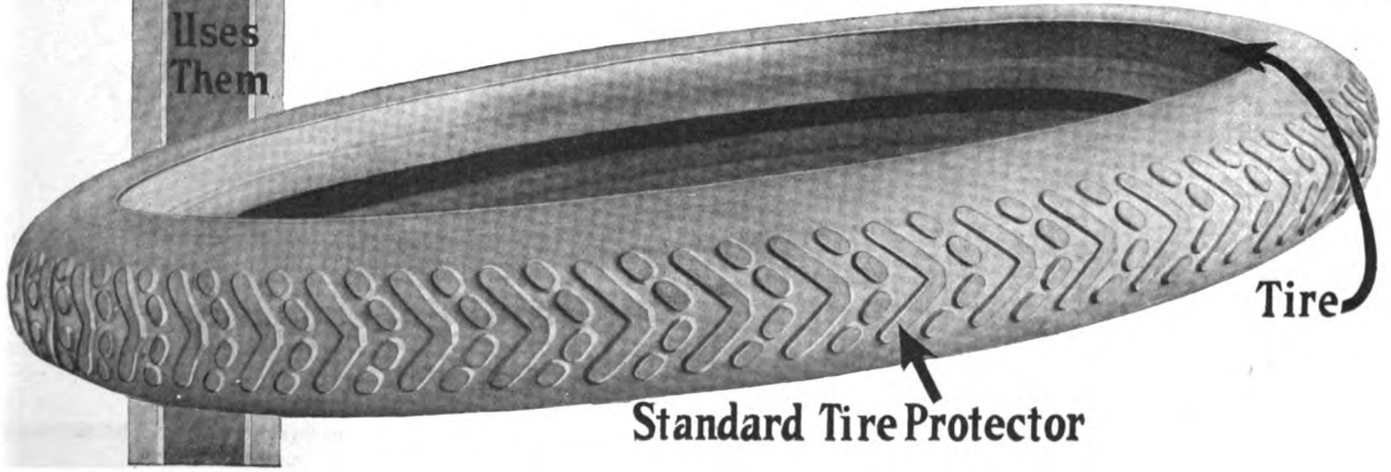
Our new manufacturing equipment gives us advantages that we share with you and your customers The demonstrated merit of Standard Tire Protectors and the reduced prices for 1912 will be made known to every motorist in America by our big advertising campaign—just starting. The advance orders show you will have five calls for Standard Tire Protectors this year for every single inquiry you had last year. And the new discounts we make will still further increase your profits.

Prepare to get your share of this business. Is your 1912 order in? If not, rush it! Write for new price list and new discounts, with particulars of our advertising support to push your sales. Write us today.

The Standard Tire Protector Co.

530 E Market St. Akron, Ohio

Ask the Man Who Uses Them



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After a Lighting System is Installed on a Car

the dynamo, batteries, wire, etc., last about as long as the car does. The lamps in time burn out and have to be replaced.

The car owner does not know as much about lamps as does the maker of lighting systems and therefore is liable to buy the wrong lamp when he has to replace.

He is satisfied with his first lamp and he can be kept **always** satisfied if "Federal" Mazda lamps are available for his replacements.



LOOK FOR THE LABEL

The Pointing Finger Shows You WHERE to Look for the Label

The reason for this is that "Federal" Mazda lamps are efficient and each lot of lamps is uniform with former lamps.

One thing is certain—the owner who uses a Federal MAZDA will always get a lamp as brilliant, economical and strong as the one he had before and many times he'll get a better lamp.

These are some of the proved reasons why dealers should carry Federal Mazda lamps and why car owners should **look for the label.**

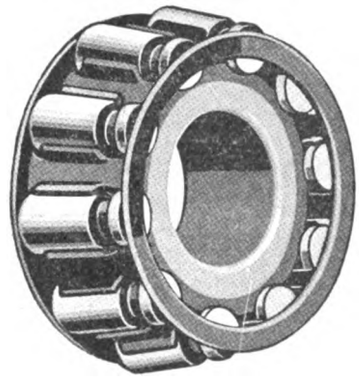
Write for Bulletin No. 12 and quantity prices.

FEDERAL MINIATURE LAMP WORKS

of the General Electric Co.

Main Office: Cleveland, 812 Hippodrome Bldg. **Chicago Branch, 301 Fort Dearborn Bldg.**

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THE Bearing that will not wear has never been made. If you could make a motor-car bearing that would not wear you could get most any price that you asked for it. One that would stand up under the weight and the load—that would meet the tremendous side pressure called "end-thrust" which comes when corners are turned—

One that would stand all the shocks from the bumps and the ruts—yet never show wear.

TIMKEN
TAPERED ROLLER BEARINGS
Have Greatest Resistance to Wear

The Timken Bearing is made of special Timken analysis steel. The steel is carbonized and heat-treated to make its surface glass hard but not brittle.

Underneath the surface the steel is left tough and elastic to cushion the shocks.

The Load is Distributed

Load, on the Timken Bearing, is distributed over the entire length of its rollers, not concentrated at points as is the case in a ball-bearing.

This wide distribution of load keeps pressure, and hence wear, down to the minimum.

The Timken principle of tapered rollers revolving about a tapered cone with two ribs—makes a bearing that takes end-thrust at the same time it is carrying vertical load.

And the end-thrust, too, is distributed along the length of the rollers.

So, in material and its treatment—in principles of design—and in actual practice in thousands of pleasure and commercial cars—it is theory proved true, that—

Timken Tapered Roller Bearings offer the greatest possible resistance to the inevitable wear—

And, when wear does come it can, in the Timken, be entirely taken up by adjustment without the least impairment of efficiency.

The Test of Actual Service

Timken Tapered Roller Bearings are used in pleasure and commercial cars made by the great majority of American builders and are being adopted by the leading foreign builders as well.

The list of Timken users reads like a blue book of car builders. Almost every car you know is named in it.

You'll be interested to have a copy of that list. It is printed in a booklet, "The Companies Timken Keeps." Send for a copy today.

The Timken Roller Bearing Company
Canton, Ohio, U. S. A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company

108

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My Greatest Success

By R. E. Olds, Designer

Trainloads of Reo the Fifth

In the past 25 years, a dozen models of mine have become the season's sensation.

Again and again I have seen the factory swamped, and men paying a bonus to get my latest creation.

But Reo the Fifth has broken all records. I never say a demand which compares with this.

Five cities at this writing have **trainload** orders with us —**orders for forty carloads each**—to go in a single shipment.

But the demand is just beginning. Very few men have yet discovered this car.

Soon there will be 10,000 cars in the hands of 10,000 owners. Ten thousand men will be telling others how Reo the Fifth performs.

Then will develop the real demand for this final car of mine.

Not a Passing Sensation

Other season sensations have come and gone. New cars and better came out to displace them.

Those days are over now. Reo the Fifth comes close to the limit in motor car engineering. It embodies the final results of my 25 years of experience. In every detail it marks the best I know.

There is no probability that we shall ever see a materially better car. The years can bring only minor changes.

It Deserves It

This car deserves popularity. That is my satisfaction.

The men who buy it get the utmost of which I am capable. There will be no regrets—none to say I misled him. And none will ever see a car which gives more for the money.

The steel in this car is all analyzed. Every vital part is put to radical test.

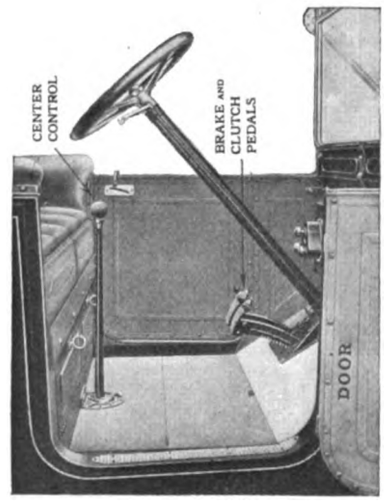
Parts are ground over and over, to get utter exactness. Inspection is carried to extremes.

There are big margins of safety. The bearings are Timken and Hyatt—roller bearings in place of the usual ball bearings.

The tonneau is roomy, the wheels are large, the car is over-tired. The carburetor is doubly heated.

The body is finished in 17 coats. The upholstering is deep, the lamps are enameled. Even the engine is nickel trimmed.

Every part of the car shows the final touch—the avoidance of petty economies. I am proud of it. Not an iota has been omitted which could add to the worth of this car.



Center Control— No Side Levers

Then here, for the first time, we get rid of all side levers. All the gear shifting is done with this center cane handle—done by the right hand. It is done by moving this lever less than three inches in each of four directions.

Both brakes are operated by foot pedals, one of which also operates the clutch. So the entrance in front, on either side, is clear.

This arrangement permits of the left side drive. The driver sits, as he should sit, close to the passing cars—on the up side of the road. Heretofore this was possible in electric cars only.

Thus we have solved the last important problems in designing.

Price Still $1,055

The price of this car remains at $1,055, though subject to instant advance. This price is too low for a car like this. It leaves no adequate margin.

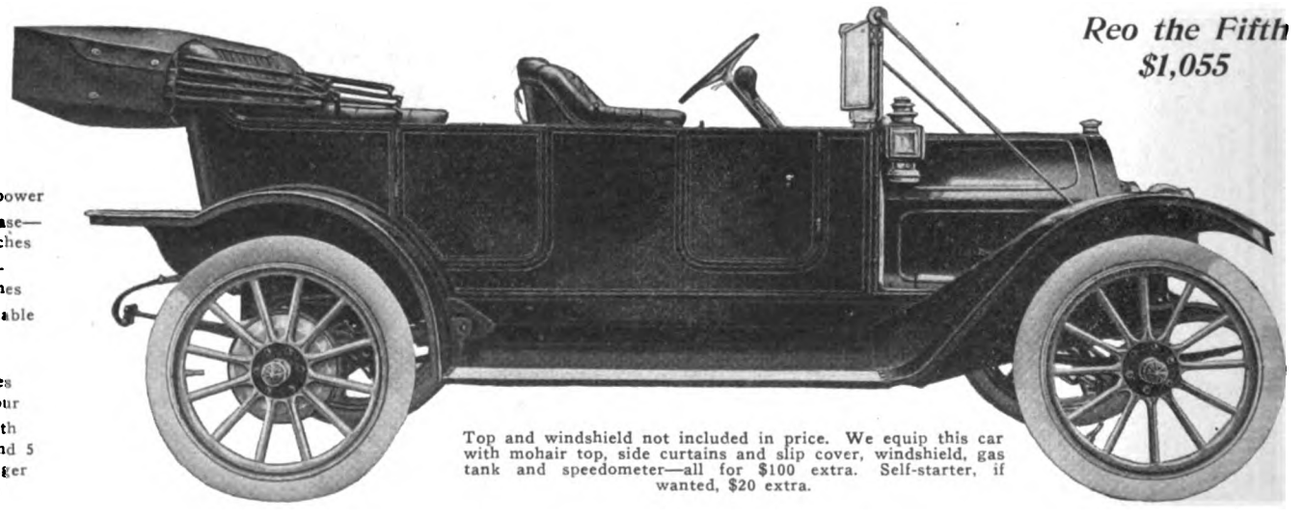
But we shall continue this price, in all probability, until materials on hand are exhausted.

1,000 Dealers

Reo the Fifth is shown by dealers in a thousand towns. We will direct you to the nearest when you send for our catalog. Please write for it now. It shows the various bodies. Address

R. M. Owen & Co. General Sales Agents for Reo Motor Car Co., Lansing, Mich.

Canadian Factory, St. Catharines, Ont.



30-35 Horsepower
Wheel Base— 112 Inches
Wheels— 34 Inches
Demountable Rims
Speed— 45 Miles per Hour
Made with 2, 4 and 5 Passenger Bodies

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $20 extra.

(70)

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A Side Chat With Dealers

Perhaps you've been among those who said to themselves "I wonder if 'Innershu' really does do the work. I wonder if it WILL stop ninety per cent. of all punctures and prevent blow-outs."

"If 'Innershu' does do this it is a great thing and I ought to tell my customers about it."

Our claims are positive and to the point.

Over 2500 DEALERS are selling "Innershu" and making friends and money by it.

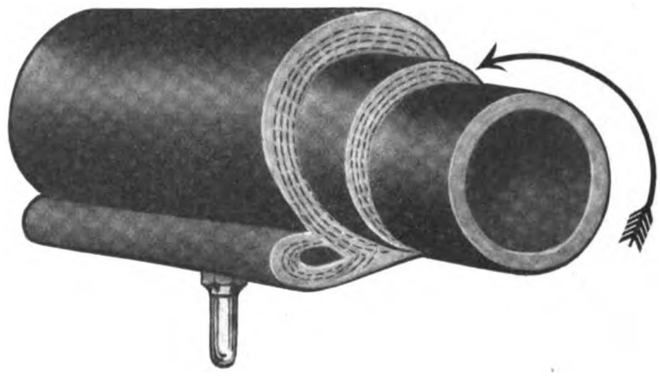
We stand back of every claim.

Replacements last year equalled less than one-tenth of one per cent.

Does it look reasonable that such a record could be established by any article that could be questioned?

"Innershu" WILL do the work. We guarantee it. Further we help our dealers—don't expect them to "go it alone."

Get a sample of "Innershu" for your own car right away. Write us today.



STOPS 90 per cent of Punctures

Prevents BLOWOUTS

Can be used with any tires. Will practically eliminate your tire troubles.

Be sure and get the genuine

"INNERSHU"

TRADE MARK

Look for this RED CIRCLE and accept no other.

For complete information write us.

INNER SHOE TIRE COMPANY, Grand Rapids, Mich.

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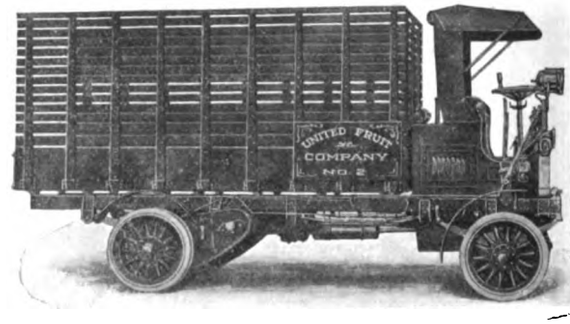
KNOX

COMMERCIAL VEHICLES

"Recognized as America's Highest Standard"



MODEL R-16, 3-TON BREWERY TRUCK

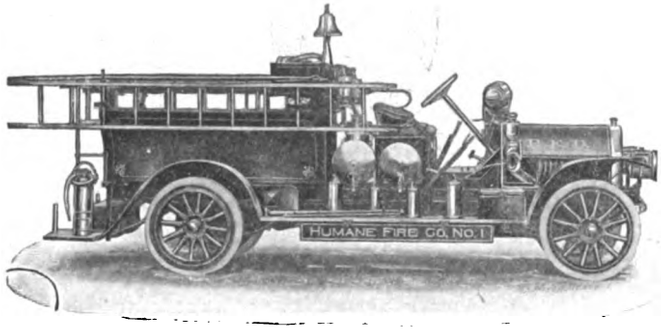


MODEL M-17, 5-TON FRUIT TRUCK

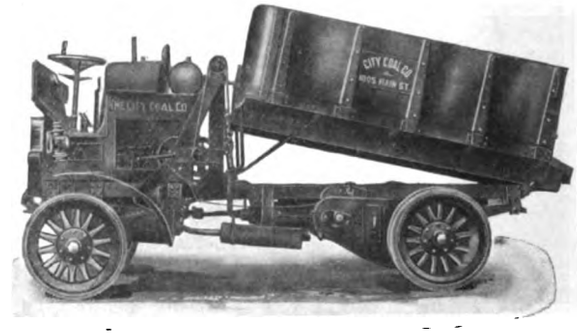
Perfected through twelve years of practical service in every field of industrial and civic use. Manufactured throughout in the most completely equipped automobile factory in the East. Built in a wide variety of models suitable for every business or civic requirement. Catalogs mailed upon request.

KNOX AUTOMOBILE COMPANY, Springfield, Mass.

Branches—New York; Chicago



MODEL M-3, COMBINATION FIRE CAR

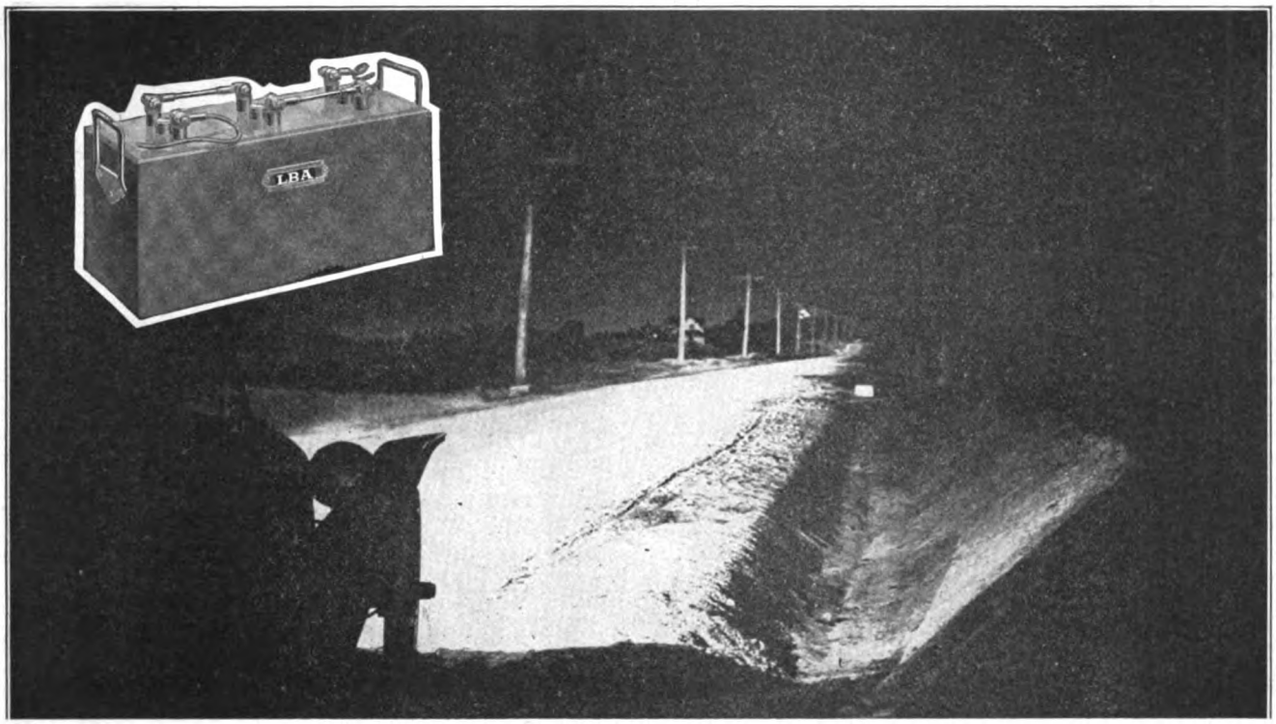


MODEL R-16, 4-TON COAL TRUCK

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THE

LBA



ELECTRIC LIGHTING BATTERY

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WILLARD STORAGE BATTERY COMPANY

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Results That Count.

THE TUTO horn is made by Warning Signal Specialists—the best in the world. A superficial examination of the TUTO horn, its completeness and neatness of equipment, its "two-tone" feature and the one button operation is proof positive of this statement.

¶ By specializing on warning signals, we have made the TUTO horn just as you would specify, if you had spent years of study and experimenting in the use of warning signals for motor cars, only we did this work several years ago and anticipated your requirements of to-day.

¶ First, the TUTO horn does all of the signalling of the motor car, displacing the inadequate bulb horn and the duplication necessary when a second or loud warning signal of the one-note type is used.

¶ Second. The TUTO horn provides with its one button and one horn, a low-abrupt-note for regular service purposes, as well as a loud-abrupt-note for an emergency signal. It is instantly responsive and extremely easy to operate, with no confusion or juggling, as is necessary when going from a bulb to a button.

¶ Third The TUTO horn comes complete with cord and protecting fixtures, making a most neat and permanent installation and assuring a positive signal every time the button is depressed.

¶ Fourth. The battery consumption is almost negligible in comparison to other signals.

¶ Fifth. The low and the loud signal notes of the TUTO horn are purposely made distinctive to get instant attention, yet not paralyzing, so as to defeat the purpose of the warning signal or to invite adverse legislation through indiscriminate use by irresponsible drivers.

¶ The more you use the TUTO horn, the more thoroughly convinced you will become of its vital importance for standard equipment on all motor cars.

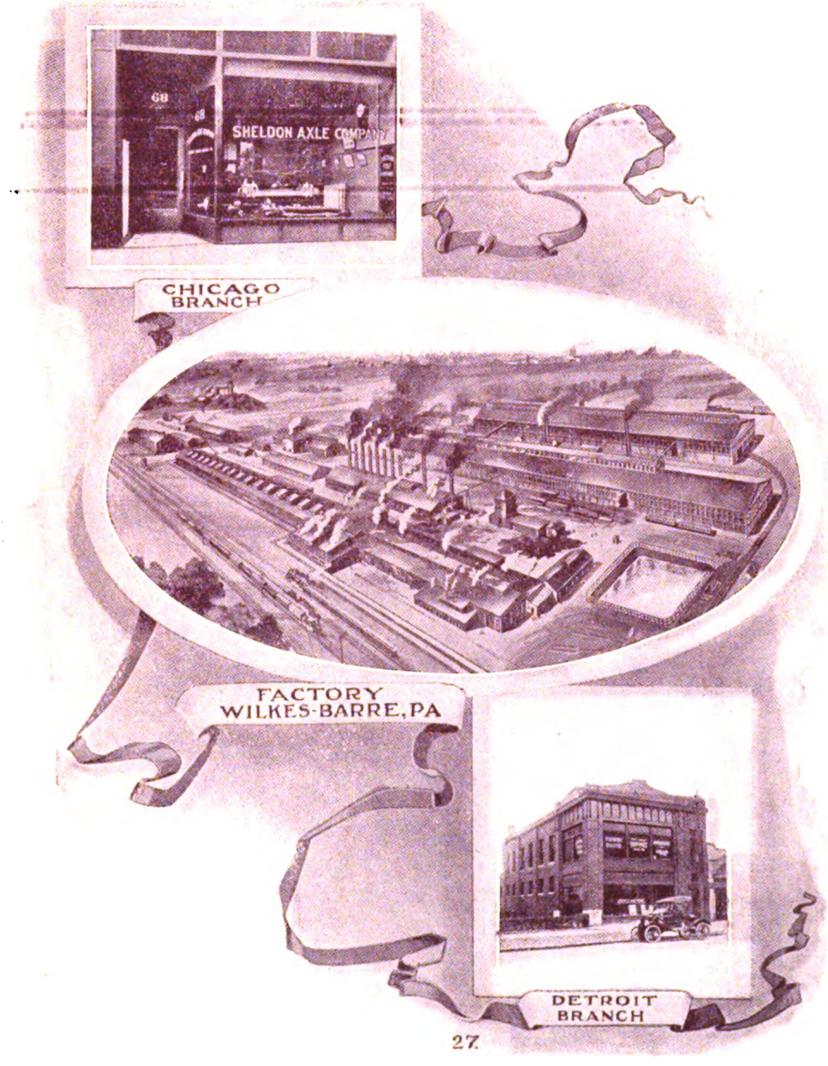
The Dean Electric Company

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen."

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SHELDON AXLE CO.



LARGEST SPRING AND AXLE PLANT IN THE WORLD

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EXPERIENCE — SHELDON — RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL
"Made in the Largest Axle Factory in the World"

In this and subsequent issues of Motor World, it is purposed to set forth the story of a plant, and its product—the plant so gigantic and the products so well known, that it needs but a single word to tell the concrete story of achievement—

SHELDON

the name that first comes to mind when springs and axles are mentioned—the name made a by-word through sterling worth of production and tremendous volume of output—the name familiar to every man in the trade and laity who studies the specifications of standard pleasure cars and commercial vehicles.

For these reasons SHELDON products are largely self-advertised—and we say "self-advertised" advisedly, because it is patent to those familiar with trade advertising that our recent publicity efforts have fallen short of the conventional mark set by hundreds of manufacturers in this field.

Up until this time we have not found it possible to adequately tell the story—We have been busy—pushed to the wall by insistently increasing demand.

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ELECTRIC SHELDON SILICO SPRINGS MANGANESE

GUARANTEED FOR LIFE

In the meantime, we have been adding shop after shop, drop forge after drop forge, furnace after furnace, lathes and drill presses by the score, until today, we point with considerable pride to a great manufacturing establishment situated in Wilkes-Barre, Pa., the heart of the Wyoming valley, where by day, gigantic pillars of steam, and by night the lurid glare of flame, marks the location of the **largest combined spring and axle plant in the world.**

And now we are going to advertise

or rather, we propose to tell a story beginning with these four pages and continuing from week to week. This story will give the "whys" and "wherefores" responsible for the existence of a plant covering fourteen acres, and employing 2,200 men, each a specialist in his line of work.

ECONOMY OF PRODUCTION: Every manufacturer in this and in every other production field sets his course by the fixed star—"Economy of production."

Competition demands it. The life of the business depends upon it.

Sometimes manufacturing economies are practised for the benefit of the ultimate user—more frequently the added proceeds go into abnormal dividends for the stockholders.

Now mark this well—SHELDON Economy of Production here set forth at length, sends its surplus right back into quality—a quality that means service for the man whose car is SHELDON equipped.

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TRANSPORTATION: The SHELDON factory immediately adjoins three main lines linking east and west, north and south. A network of sidings brings the cars of raw material right into the factory and take the finished product out. We have no teaming.

FUEL: There are coal breakers within 1,500 feet of this plant. The very ground upon which it stands is honeycombed with tunnels and workings. We buy many thousand tons of coal yearly—it costs about $2.00 per ton. Figure the cost of coal delivered from 150 to 500 miles away, and form your own conclusions.

LABOR: The location of the SHELDON plants in the hard coal regions, gives us a superior personnel in the shape of men particularly fitted, through sturdy physique, to do the most and best work in the heavy processes involved in the manufacture of springs and axles.

PURCHASE OF RAW MATERIALS: The SHELDON factory turns out more springs than any other concern in existence—ranging from the light carriage spring to the heaviest spring used on commercial trucks. The axle department, also a tremendous organization, produces hundreds of axles daily. It follows that our purchase of steel in the tremendous quantities necessary for these purposes, gives prices much lower than competition in our particular field.

SOURCE OF SUPPLY: This factory is closer to the steel market than any other similar plant in America, reducing transportation charges on raw material, and when you multiply the savings on one car by the savings on a great many thousands of cars, the result is pronounced.

FACTORY DETAILS: There are a hundred and one minor methods of saving made possible because this business has been reduced to such an exact science that nothing tending toward waste can escape the trained eye of our spring and axle specialists. Scientific methods obtaining here, have reduced all losses in manufacture to a minimum.



In making an introduction to an interesting story, we have but one object in mind—to thoroughly impress the manufacturer that the SHELDON economy of production is much more than a name—that is, it is one of the biggest factors in the making of **quality** springs and axles.

Years have been spent in perfecting this organization which, today, stands without a peer as a model of standardized, exact spring and axle practice, backed by an engineering staff larger and superior to that of any other concern in existence.

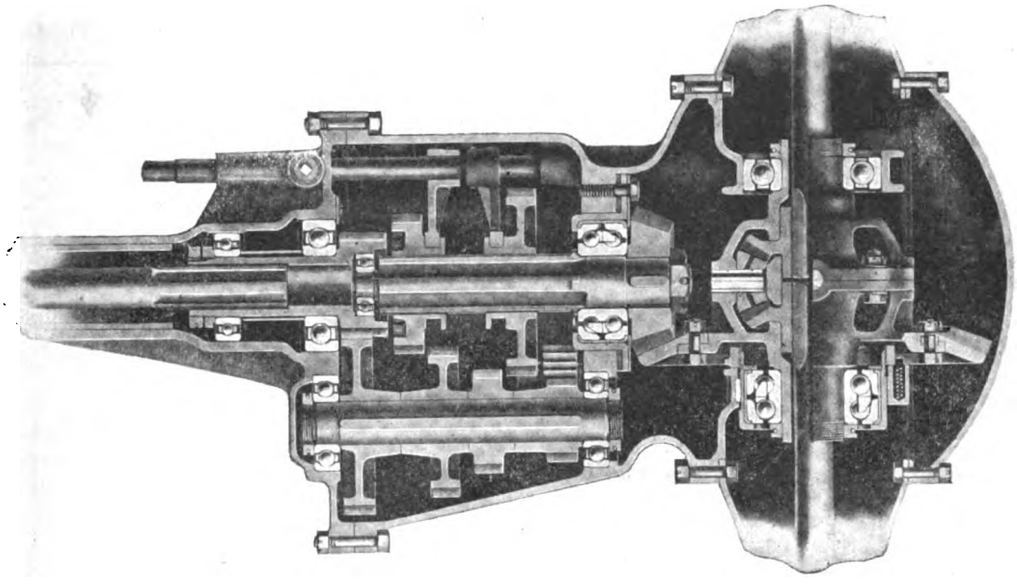
In every process of construction, from primal design to final polish, we put brains at a premium, and so it is that we have devised the following formula which holds good in the production of every spring and every axle leaving our factory.

Brains: Ninety per cent. Material: Ten per cent.

Next week we will begin the discussion of axles—what they ought to be, and what they frequently are not.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

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American Made FOR American Trade

New Departure GUARANTEED Ball Bearings

In Sixty Per Cent. of American Cars

SUPERIOR FOR THE TRANSMISSION: The success of New Departure Double Row ball bearings in resisting excessive radial loads and thrust stresses is demonstrated in the fact that this bearing is more commonly used than any other in the transmission back of the bevel pinion. It does away with the cumbersome thrust washer, complicated and expensive mounting and gives maximum efficiency and durability.

NUMEROUS ADVANTAGES IN THE DIFFERENTIAL: The use of the New Departure Double Row on the side of the differential insures simple, economical, ample provision for carrying the considerable thrust loads from the ring gear, fixes the working relation of the parts and prevents "slapping" of the gears. These are important advantages.

New Departure Single Row Ball Bearings are employed in the construction illustrated above, to care for radial loads only. This bearing has no superior, is absolutely guaranteed for strength of material, quality of workmanship and accuracy of finish.

CATALOG ON REQUEST—HIGHLY SPECIALIZED ENGINERRING INFORMATION ON YOUR BEARING PROBLEMS FOR THE ASKING

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.

Western Branch—1016-17 Ford Building, Detroit, Mich.

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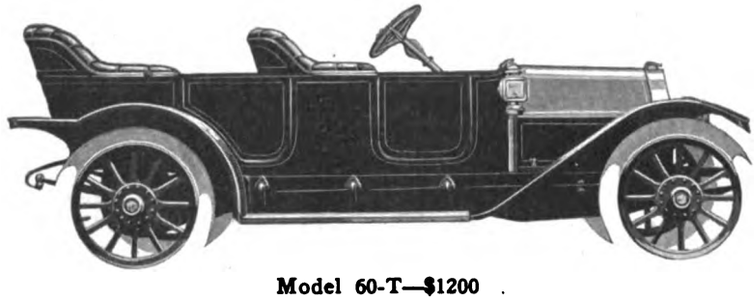
Overland

THE lowest priced 35 horsepower touring car in the country is the big powerful Overland—Model 60—the most finely constructed of 1912 fore-door cars.

This excellent car costs $1200. You get every feature incorporated in the $1500 machines of the season—the convenient center control, roomy five passenger capacity, long wheel base, powerful and siletn motor, comfort and service.

The nation-wide sweep of Overland popularity is founded on the honest proposition of more car for less money. Compare the many Overlands you see in the passing parade. Write for book I-45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4½ x 4½; horse-power, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, May 2, 1912. No. 6

ALVORD TO ACQUIRE SPLITDORF

Long Pending Negotiations on the Point of Consummation—Means Removal of Splitdorf Plant to New Jersey.

Negotiations between John M. Alvord, of New York City and Torrington, Conn., and C. F. Splitdorf, Inc., of New York City, which have been in progress for several months, and which on at least two previous occasions appeared near to consummation finally have been brought to a point where only the signatures of the interested parties are necessary to convey the Splitdorf business to the Alvord interests. It is understood that these signatures will be attached on or before Saturday next.

Despite the prominence of the Splitdorf establishment and the diversified interests of Alvord, not very many persons identified with the automobile trade have been aware of the negotiations, and the transaction is likely to prove one of the real surprises of the season. Although a capitalist of great means, and the owner of the Excelsior Needle Co., The Standard Co., The Torrington Co. and other industries in the Naugatuck Valley of Connecticut, Alvord is little known to even the prominent men of the automobile industry, despite the fact that among his many possessions is The Eagle Co., of Newark, N. J., which produces windshields and other automobile accessories.

The exact terms of the contract between Alvord and Splitdorf are not public property, but it is known that they will bring a million dollars or more into the Splitdorf business and that the Splitdorf brothers, John and Charles F., will retain a substantial interest, secured by handsome blocks of preferred stock in the enlarged company which will be brought about and which will perpetuate the name Splitdorf and continue the manufacture of Splitdorf magnetos and other ignition specialties.

The deal will carry with it the removal of the Splitdorf plant from New York City to Newark, N. J., where it will be established in the former Domestic sewing machine factory, which is owned by Mr. Alvord and which now is occupied by The Eagle Co. and several other of his allied concerns, several of which will be removed to Torrington. The change of base will not be wholly unwelcome to the Splitdorfs as, during the past year, they have suffered severely from the effects of a strike which resulted in a reduction of their working day from ten to eight hours, thereby upsetting their estimates and greatly affecting both the cost and quantity of their productions and placing them at other disadvantages. In New York City also, the Splitdorf industry is scattered in three separate buildings, which likewise has its inconveniences. In Newark, the entire plant will be housed in one building and with favorable labor conditions and working hours it is anticipated that the benefits that will accrue will be widely felt, the Alvord capital and influence, plus the Splitdorf experience and reputation being a combination that cannot fail to exert far-reaching effect.

Willys Assumes Gramm Presidency.

Having acquired control of the Gramm Motor Car Co., of Lima, Ohio, John N. Willys has formally assumed the presidency thereof. He was elected to the office at a meeting held in Lima last week, at which time George W. Bennett, Willys's right hand man, who is vice-president of the Willys-Overland Co., became treasurer of the Gramm corporation and R. J. D. Keplinger, secretary. B. A. Gramm remains one of the five directors, and with Max Bernstein and the three officials named constitutes the board.

Hewitt Men on International Board.

E. C. Converse and Ambrose Monell, directors of the Hewitt Motor Co., of New York, which recently was taken over by the International Motor Co., have been elected directors of the latter corporation. Converse, who is president of the Bankers' Trust Co., also has succeeded W. D. Sargeant as chairman of the International board of directors.

WANTS $150,000 FOR HIS SERVICES

Found Buyer for $5,000,000 General Motors' Notes but Hitch Developed—General Motors Makes Certain Admissions.

When the case of Horton vs. General Motors Co., which has been placed on the May calendar of the New York Supreme Court, comes to trial, Harry L. Horton probably will discover just where the General Motors Co. ends and where the General Motors Securities Co. begins. Horton is suing the General Motors Co. for $150,500, not wholly on his own account, but as the assignee of one Neil MacDonald, who claims to have rendered services to the big corporation which was worth the large sum which he specifies, the service consisting in having found a purchaser for $5,000,000 worth of General Motors 6 per cent. gold debentures.

According to the complaint, the service was rendered between January 1, 1910, and December 1 of the same year, during which period MacDonald was "devising and advising concerning plans for the raising of money to meet the defendant's needs by the sale of its securities." On or about March 18th MacDonald claims that he arranged for the sale of the debenture bonds to the value of $5,000,000, to Tucker, Anthony & Co., of New York, at an agreed price of 89, the prospective purchaser relying upon the truth and accuracy of the General Motors financial condition as disclosed by itself. This statement, it is alleged, showed that the total liabilities of the General Motors Co., and its constituent companies, exclusive of capital stock, amounted to $7,500,000, when, as a matter of fact, they were in excess of $15,000,000. By reason of this and other alleged misstatements, Tucker, Anthony & Co refused to purchase the debentures unless they were protected by a mortgage on the Buick or Cadillac plants, or other adequate mortgage security, which, however, the General Motors Co. refused to execute and the deal fell

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through. It is for work he did in this connection, and the consequent disappointment and loss due to the failure of the deal to be consummated, that Horton, as assignee of MacDonald, believes he is entitled to $150,500. The odd $500 represents traveling expenses incurred by MacDonald in prosecuting his operations.

Its answer, which is sworn to by W. C. Durant, vice-president of the General Motors Co., practically serves notice on Horton that he is "barking up the wrong tree," and that instead of suing the General Motors Co., his action should be leveled at the General Motors Securities Co. In his affidavit, Durant admits that he entered into negotiations with MacDonald and requested him to render service, not to the General Motors Co. but to the General Motors Securities Co., which then was in process of formation and which thereafter was formally organized, the understanding being that MacDonald's compensation would be paid by the General Motors Securities Co. and would amount to 25 per cent. of the half-interest owned by the General Motors Co. "in the net profits of the said General Motors Securities Co. from the handling of such securities as should be sold and paid for" during the period between March 1 and June 1, 1910. The General Motors Co. also admits that it gave to Tucker, Anthony & Co. an option, expiring April 1, 1910, to purchase certain of its notes which were to be issued, and that in doing so it submitted to that firm a statement showing its financial condtion as to September 30, 1909. As Tucker, Anthony & Co. did not exercise the option, or enter into any contract with the General Motors Co., through no fault of the latter, it is alleged, the General Motors Co. denies liability and asks that the suit be dismissed.

Creditors Take Over Grabowsky Truck.

Having over-extended itself, the Grabowsky Power Wagon Co., of Detroit, found itself in such difficulties that its creditors were called together in Detroit last week in an effort to relieve the pressure. About one hundred creditors were represented at the meeting, at which it was disclosed that the Grabowsky liabilities aggregate $405,000 and its assets $1,250,000. After thoroughly discussing the situation, a plan was formulated whereby a committee of four, representing the largest creditors, will take charge of the business and conduct it until the present obligations have been discharged. As soon as this is effected, the company will be turned back to its stockholders. The committee consists of W. K. Pruden, the wheel manufacturer; H. W. Chapin, of the Brown-Lipe-Chapin Co.;H. S. Firestone, of the Firestone Tire & Rubber Co., and B. F. Tobin, of the Continental Motor Mfg. Co. While the plan of action has been agreed to by a majority of the creditors, several formalities remain to be concluded before it becomes effective, but there is no doubt that the measure of relief adopted will be consummated.

BACKER BRINGS DOWN DORIAN RIM

His Banking Troubles Finally Entail Receivership for Rim Company—Efforts to Refinance It Prove Vain.

Efforts to save the Dorian Remountable Rim Co., of New York, and to prevent it from following its president and financial sponsor into the bankruptcy court, which at one time seemed practically assured, finally proved vain, and on Thursday last, 25th inst., three creditors joined in a petition asking that the company be adjudicated a bankrupt. In response to the petition, Judge Mayer, in the United States District Court for the Southern District of New York, appointed Joseph M. Conklin receiver, under a bond of $40,000. Later, on Saturday last, 27th ult., Martin D. Henkel, Arthur D. Alexander and Joseph S. Josephs were appointed appraisers and permission was given the receiver to sell the office furniture and fixtures.

The petition alleged that the Dorian liabilities are greatly in excess of $200,000, while the assets, at a fair valuation, do not exceed $100,000. Offers for the sale of the business in its entirety had been made but they were far from satisfactory, and as one of the creditors had given notice of his purpose to prosecute his action to judgment the petitioning creditors applied for a receiver in order to conserve the best interests of all.

The Dorian company's failure is directly due to the personal entanglements of M. Rosett, its president and backer, who conducted a chain of private banks in New York and other states, all of which were patronized chiefly by working people and foreigners of the humbler class. These banks went to smash early in March last, at which time Conklin was appointed their receiver. He also took charge of the Rim company as part of Rosett's assets.

At the time of the bank failures, it was feared that, although in a prosperous condition, the Rim company would be involved in the trouble. Strenuous efforts were made to refinance it and place it on its feet, independent of Rosett, and success appeared likely, but several obstacles interposed which could not be overcome; and, for the best interests of all, the receivership proceedings were instituted.

According to counsel for the petitioning creditors, Rosett has invested $97,000 in the stock of the Dorian company, and in addition has loaned it $200,000. He, therefore, figures as the largest creditor. The other liabilities are said to aggregate only $15,000.

Muskegon Motor Plant to be Continued.

Reports that the Muskegon (Mich.) plant of the Continental Motor Mfg. Co. will be abandoned when, in July next, that company takes possession of its immense plant which now is nearing completion in Detroit, are emphatically denied by President Tobin. He states that while the general offices and the entire headquarters staff will be removed from Muskegon to Detroit, the plant at Muskegon will be operated as a branch factory, and that in view of the present demand for Continental engines there is no thought of shutting it down.

Three Added to Henderson's Staff.

L. S. French, C. K. Share and F. E. Wilson have become identified with the Henderson Motor Car Co., of Indianapolis, which recently was organized by R. P. Henderson and of which he may be president. Like Henderson himself, French formerly was with the Henderson Motor Sales Co., when it distributed Cole cars. He served as advertising manager but resigned about two months since to enter the piano business in the West. He has returned to Indianapolis, however, and will be a stockholder and secretary of the new Henderson company. C. K. Share, who previously was with the Willys-Overland Co., will become treasurer of Henderson's new enterprise, of which Wilson will be the sales manager. Formerly Wilson occupied the same position with the Marion Sales Co.

Suit Involving Imported Axles Settled.

Just as it was due for trial in the New York Supreme Court, the suit of the G. J. G. Motor Car Co., of White Plains, N. Y., against the Krefeld Steel Co., of Krefeld, Germany, was amicably settled this week. The trouble grew out of a purchase of Krefeld axles which the G. J. G. company claimed were not according to specifications and which, because of their failure in actual use, caused injury and damage to the American company. In its answer, however, the Krefeld Steel Co. set up a counterclaim on the ground that the axles had not been paid for. As the case was settled out of court, the merits of the several allegations were not gone into.

Overland Completes Its Big Addition.

The four-story 300x400 foot concrete addition to the Willys-Overland plant in Toledo, Ohio, has been completed and the necessary machinery now is being installed. It is expected that with the added facilities John N. Willys's projected output of 25,000 cars during the present year will be attained, 16,000 of them having already been built and shipped. The high water mark of 900 cars a week was touched two weeks since.

Billings & Spencer Discontinue Middlemen.

After having continued for some two years, the selling arrangement whereby Claire L. Barnes & Co., of Chicago and Detroit, marketed the product of the Billings & Spencer Co., of Hartford, Conn., has been discontinued. As was the case before the arrangement was effected, the Billings & Spencer Co. will market its forgings and tools direct to the trade.

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MARCH'S INCREASE 56 PER CENT

Exports Continue Upward Trend—Revolution-Ridden Mexico Only Country That Shows Much Reduced Purchases.

After attaining a new high record in January, which was still further increased the following month, it is not strange that the exports of American automobiles and parts should feel the pace and slow up slightly during March, though the net total still shows a substantial gain over the same months one year ago; the figure for March, 1911, was $1,638,947, whereas during the corresponding month this year $2,549,348 worth of cars and parts were shipped out of the United States. The gain amounts to $910,401, which represents an increase of approximately 56 per cent. Of this total sum $2,125,565 represents the value of 2,222 complete automobiles, last year's figures being $1,364,402 for 1,510 cars. The remainder, $423,783, represents the value of parts, as against $274,545 for the month of March, 1911. The average value per exported car increased from $837 in 1911 to $956 in 1912. Last month is was $946.

As was the case last month, all but two of the twelve geographical divisions mentioned in the government statistics increased their purchases, Canada leading as usual with an increase of $148,854 over the figure for the corresponding month last year, which was $778,402. Germany and Italy, which last month were the only countries to show a decrease, both show a substantial increase this month, the figures being $40,335, as against $14,494, and $33,893, as against $29,016, respectively. The United Kingdom and revolution-ridden Mexico are the two divisions which this month exhibit decreases, the loss in the case of the former being $16,164 and $48,665 in the case of the latter; the figures for the month of March, 1911, were $330,223 and $61,161, respectively. British Oceania was the third heaviest purchaser and took $334,376 worth as against $83,894 for the same period last year, which is the greatest increase listed.

For the nine months ending March, 1912, 14,569 complete cars, valued at $14,189,948, and parts to the value of $2,850,047 were exported, bringing the grand total up to $17,039,995, as against $9,837,181 for the corresponding period last year; the actual gain was $7,202,814. Complete details are shown by the subjoined table.

Slight Drop in Exports of Engines.

For the month of March, the exports of automobile engines were slightly lower than the figures for the previous month, 831 complete engines valued at $102,010 being shipped to foreign countries, as against 954 engines valued at $113,871, which were exported during February. At the close of the nine months ending March, 1912, the total number of engines exported during the period was 4,315 and they were valued at $519,318. As the government statisticians did not list automobile motors separately until July, 1911, comparative figures for the corresponding period of last year are not available.

Hartford Suspension Takes Up Plugs.

Having developed and taken up the production of an electric lighting and engine starting device, it is not so surprising as otherwise would be the case that the Hartford Suspension Co., of Jersey City, N. J., manufacturers of the famous Truffault-Hartford shock absorbers, should embark in the production of spark plugs. At any rate, the Hartford company has done that very thing, and although its plug is not quite ready for market, it is known that it is of the two-piece type and that it will be of the same quality that characterizes the other Hartford productions.

American Tires Continue Foreign Gains.

The exportation of American-made tires retained its strength during the month of March, the shipments attaining a value of $228,098, as compared with $131,183 for the same month last year; the gain is $96,915 and represents an increase of 74 per cent. During the nine months ending March, 1912, $1,869,471 worth of American tires were exported to foreign countries, the figures for the corresponding period of the year before being $1,325,903. The increase is approximately 41 per cent.

LOCKWOOD SURVEYS FOREIGN FIELD

Regal's Returned Export Chief Talks of Conditions Abroad—Where America is Weak and Where Strong.

R. M. Lockwood, who recently completed almost a globe-girdling tour in the interests of the Regal Motor Car Co., had the unique experience of passing through the scene of the Italian-Turkish war, the Chinese revolution and the Mexican uprising, to say nothing of having witnessed the Durbar in India.

In China, Lockwood found the Chinese particularly partial to American motor cars, but the field is limited, as the use of automobiles is confined almost exclusively to Shanghai and Tien Tsin. None of the other large cities have suitable streets or roads. In Egypt also automobiles can be used only in the cities of Cairo and Alexandria. There are no suitable roads elsewhere. There are few cars in Egypt and most of the few are of either English or French manufacture.

"In India I found the roads excellent, but nearly all the cars are of English make," says Lockwood, in summarizing his observations. "The dealers themselves are Englishmen and it is difficult to overcome their prejudice against American productions. These same conditions exist in Ceylon, though the field for automobiles is somewhat more limited.

"The people of the Straits Settlements and Malay States are favored with very good roads. Their dealers also are Englishmen, but contrary to the usual rule these Englishment seem to look with favor on the American automobile. Our cars are generally popular and many of them are in use. In Java there are a large number of motor cars, considering the small European population. This is due principally to the fine roads and general prosperity. The makes of cars represented include the products of practically all the countries manufacturing automobiles and no one nation can be said to control the market.

"In the Philippine Islands the American

	March				Nine months ending March					
	1911		1912		1910		1911		1912	
	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.
Automobiles	1,510	$1,364,402	2,222	$2,125,565	4,180	$5,372,458	7,350	$8,285,294	14,569	$14,189,948
Exported to—										
United Kingdom		330,223	369	314,059		1,344,600		1,657,990	4,137	3,302,205
France		70,434	97	84,419		376,166		345,222	340	304,153
Germany		14,494	59	40,335		117,805		185,699	148	106,986
Italy		29,016	22	33,893		217,927		130,707	118	106,066
Other Europe		42,779	117	97,918		184,654		442,276	689	583,093
Canada		778,402	911	927,256		2,509,810		3,884,447	3,615	4,176,594
Mexico		61,161	6	12,496		406,870		545,641	242	372,468
West Indies and Bermuda		29,255	32	33,853		372,579		311,232	227	247,966
South America		74,437	101	112,678		231,834		594,284	1,151	1,385,718
British Oceania		83,898	364	334,376		297,301		905,684	2,900	2,587,923
Asia and other Oceania		86,001	98	94,869		206,452		614,650	709	729,153
Other countries		38,847	46	39,413		116,273		219,349	293	287,623
Parts of (except tires)		274,545		423,783		1,009,813		1,551,887		2,850,047
Total		$1,638,947		$2,549,348		$6,382,271		$9,837,181		$17,039,995

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manufacturers, not unnaturally, dominate the field, and in spite of the poor roads there are a great many cars owned in Manila and the largest cities. The future for American cars on the islands is very bright. This statement is equally true of the situation in Japan, though the people there prefer the small American touring car to the larger models. At present the use of automobiles is largely confined to cities like Tokyo and Yokohama. While the roads are good they are too narrow, but the fact that the government has recently appropriated a large sum of money for widening the roads, makes it seem quite probable that in time motoring will become very popular throughout the Mikado's dominioins."

Babcock Backbone of Buffalo Merger.

Beliefs that the Babcock Electric Carriage Co. constituted the backbone of the recently organized Buffalo Electric Vehicle Co. were confirmed this week when the identity of the units of that million dollar merger, or holding company, were made public. The Babcock company heads the list, the others being the Clark Motor Co., the Buffalo Electric Carriage Co. and the Buffalo Automobile Station Co., the latter of which operates one of the largest and most completely appointed electric garages in the country.

The new corporation, which has acquired the capital stock of the four companies, will amalgamate the business of the several establishments and prosecute their affairs on a much enlarged and more aggressive scale.

Having acquired the capital stock of each of the subsidiaries, the officers of the Buffalo Electric Vehicle Co., whose identity first was made public in the Motor World last week, have been elected officers of the several units. They are as follows: Samuel J. Dark, president; A. A. Landon, vice-president, in charge of manufactures; William A. Morgan, vice-president, in charge of sales; Harry Yates, treasurer, and Alfred W. Thorn, secretary.

The preferred stock of the corporation, to the amount of $300,000, has been wholly underwritten by a Buffalo syndicate and a large part of it disposed to residents of Buffalo. The unsold portion will be offered for public subscription during the present month.

Concerning the conduct of the business itself, little or nothing is obtainable. J. W. Van Allen, the attorney for the company and one of its directors, who, for the time being at least, is its mouthpiece, is not prolific of information, and the other officers will say even less than Van Allen.

Grabowsky Leaves Alden Sampson.

Morris Grabowsky, vice-president of the Alden Sampson Co., of Detroit, which is one of the United States Motor Co.'s possessions, has resigned that office. He has made no plans for the immediate future, and probably will "rest up" for a while.

BIG HATS AT N. A. A. M. MEETING

Talk of Their Effect on Limousines Enlivens Its Affairs—Truck Dimensions and Demonstration Charges Advised.

Though the business of adopting standard lengths and widths for motor truck frames occupied the greater part of the attention of the members of the executive committee of the National Association of Automobile Manufacturers, who met yesterday in regular monthly session, in New York, and this serious business was further augmented by the election of the Federal Motor Truck Co., Detroit, Mich., to membership, a humorous twist was given the proceedings when a Western manufacturer arose and declared in all seriousness that the growing size of women's headgear constituted a real problem in the designing of closed car bodies, and maintained that the subject was worthy of consideration. The prevailing style in hats, he said, necessitated such a "spread" and the "creations" protruded so far upward or backward that it has become difficult to design limousine bodies to meet their needs. Most of the members viewed the matter rather mirthfully, and it finally was suggested that the maker in question constitute himself a committee of one to visit the leading milliners and ascertain what the forthcoming styles in hats were likely to evolve.

As regards the standard truck frame sizes that formally were adopted, two widths—36 inches and 42 inches—and 20 lengths, graduated by feet and half feet were agreed upon, the figures being as follows: Inches—48, 60, 72, 84, 96, 108, 114, 120, 126, 132, 138, 144, 150, 156, 168, 180, 192, 204, 210, 216.

The object in recommending these frame dimensions is to provide standard widths and lengths toward which manufacturers can work with a view to providing for interchangeability of bodies on trucks of different makes and models in the future and to enable the body builder to make up stock bodies that can be delivered without delay and placed on any make of truck. The desirability of such standards is shown by the fact that measurements of 88 different models by various manufacturers presented 19 different widths, from 28 to 46 inches, and that upward of 100 models showed 41 different lengths of frame back of seat, from 48 inches to 218 inches. By graduating the lengths by multiples of 6 inches, from 4 feet to 18 feet it was found that these could be reduced to 20 lengths.

The question of the desirability of making charge for commercial vehicle demonstrations also came up for discussion and resolutions recommending the following charges were adopted: ½-ton truck, $10 a day; 1-ton truck, $10 a day; 2-ton truck, $15 a day; 3-ton truck, $20 a day; 4-ton truck, $25 a day; 5-ton truck, $30 a day; 6-ton truck, $30 a day; 7 and 8-ton trucks, $35 a day; 9 and 10-ton trucks, $40 a day.

Quinby Relinquishes Isotta Agency.

After having combined the business of body building and selling the Isotta-Fraschini cars in this country for several years, the J. M. Quinby Co. finally have relinquished the imported production and hereafter will handle only American cars—the Simplex and the S. G. V. The Isotta-Fraschini agency for the United States has been transferred to a new company, the Isotta-Fraschini Motors Co., which just has been organized with $25,000 capital and which yesterday took possession of the premises 1849 Broadway, New York, the Quinby store at 54th street and Broadway being relinquished. Quinby & Co., however, will continue to build the bodies for the Isotta cars and their Simplex and S. G. V. cars will share the salesrooms of the new company.

The officers of the Isotta-Fraschini company are: G. M. Heckscher, president; G. E. Parker, vice-president; G. M. Thurber, second vice-president and general manager; C. B. Jaqua, secretary-treasurer. G. M. Heckscher, the president of the company, is a son of the well-known mining man of that name, with whom Jaqua also has been associated; G. E. Parker, the vice-president, is an attorney, and the second vice-president, G. M. Thurber, who will be general manager also of the Isotta-Fraschini Motors Co., has been serving as manager of the Quinby car department, and his new office is merely in the line of continuing his work.

Imports Hold Their Renewed Strength.

As was the case last month, when for the first time in three years, imports of automobiles into the United States showed increased shipments from each of the four leading manufacturing countries of Europe, similar advances are shown for the month of March. The total figures for the month amount to 69 cars valued at $161,263, as against 48 cars valued at $92,206 for the corresponding month last year. The increase represents a gain of 48 per cent. in the number of cars imported and 75 per cent. in their value. The respective quantities are as follows:

Imported from	No.	Value.	No.	Value.
United Kingdom..	8	$17,314	9	$27,511
France	22	39,644	42	96,783
Germany	3	5,976	4	11,282
Italy	4	6,631	5	6,666
Other countries...	11	22,641	9	19,021
Total cars.....	48	$92,206	69	$161,263
Parts of.....		$28,623		$28,020
Total cars, parts		$120,829		$189,283

The figures for the nine months ending March, 1912, show that 786 cars, valued at $1,733,639, and parts valued at $240,212 were imported as against 634 cars valued at $1,342350 and parts to the value of $240,-868 for the corresponding period last year.

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Charles Kellogg is about to open a garage in Centerville, Ia.

Bunn & Goembel is the style of a new garage firm in Pipestone, Minn.

A new garage is to be opened in Fulda, Minn., by F. W. Johnson.

Emerick Bros. and S. Childers are building a new garage in Medford, Ore.

Charles Taylor and Perle Schenck have opened a garage in Pomeroy, Ia.

The Orland (Cal.) Garage has been purchased by Tom and Roscoe Scribner.

August Schierenbeck has sold the St. Mary's Auto Garage, of St. Mary's, O., to Stafford Noble.

A garage in Dinuba, Cal. It is 44 x 64 feet and is nearly ready for occupancy.

A new garage, 50 x 125 feet, is to be erected at Flandreau, S. D., by John Ingvalson, the town's blacksmith.

Amos L. Harris and L. B. Giddens have formed a partnership in Jacksonville, Fla., where they will sell Velie cars.

The Creston Implement Co., of Creston, Ia., has sold its automobile department to George A. Anderson, of Massena, Ia.

Two physicians, Dr. Arthur H. Cutter and Dr. Harry H. Nevers, will build a garage at 343 Broadway, Lawrence, Mass.

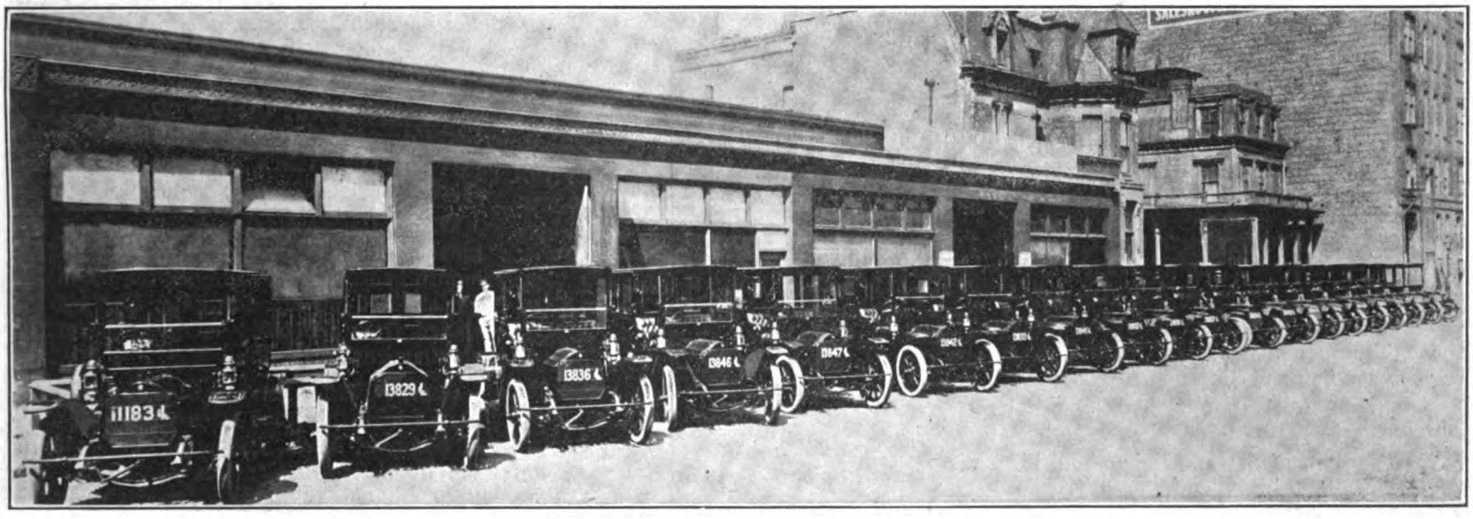
The Grundy Motor Sales Co. has been

Diego, Cal., have secured the agency for Oakland cars and will establish a garage and salesroom.

W. C. Morehouse and Malcolm Parrott have opened an automobile livery in Poughkeepsie, N. Y. They will operate as Morehouse & Parrott.

D. E. Kelly, owner of the Clinton (Ia.) Auto & Supply Co., has sold out to the Model Auto Co., which will operate both establishments.

The Grand Garage, at Santa Rosa, Cal., formerly conducted by C. F. Reynolds, has been purchased by R. J. H. McKee, B. Kent and Robert Taffinger.



FRANK PARMELEE CO.'S FLEET OF GARFORD CARS THAT PLY FOR HIRE IN CHICAGO

J. A. Anderson has laid the foundations for a garage and machine shop in Jamestown, N. D.

Jean H. Duffy has opened a repair shop and a garage at 820-824 Julia street, New Orleans, La.

Phillips & Taylor, Owosso, Mich., will open a garage and place several taxicabs in service.

F. L. Geiger, of Manchester, N. H., has embarked in the garage business in Sanbornville, N. H.

A garage covering four city lots is to be erected in Fresno, Cal., by W. H. Ackerman; it will cost $9,750.

McDonald & Fountain is the style of a new firm in Hawley, Minn., which sell and repair automobiles.

The American Auto Supply Co., of New York has opened a Chicago branch at 1408 Michigan avenue.

Thomas Thorpe is erecting an iron gar-

organized in Los Angeles, Cal. The firm members are C. Fred, W. and J. R. Grundy.

A new garage is to be opened in Azusa, Cal., in Center street near Azusa avenue, by George W. Knight and Ralph N. Burt.

Meeker, Col., is about to become possessed of its first garage. It is being built by H. H. Joy, the city's water commissioner.

The Vickman Auto Co. has been organized in Minneapolis, Minn., to distribute Auburn cars. It has located at 311 Third street.

A half interest in the McPherson (Kan.) Motor Co. has been purchased by Milan Riddell, who will enter actively into the business.

Joseph R. Sutterly has opened an exchange for second-hand cars in Trenton, N. J., at South Clinton avenue and East State street.

H. B. Young and W. F. Lloyd, of San

E. J. Montigny, of Brooklyn, N. Y., who has the Long Island agency for the Stutz car, has removed from 33 Grant Square to 1289-1291 Bedford avenue.

Stoffel & Bosustow, who conducted a garage and automobile agency in Racine, Wis., have dissolved partnership. Bosustow will continue the business.

Clinton R. Foutz, who has been prominent in the automobile affairs of Baltimore, Md., has launched into the trade. He will handle the Havers "six."

D. S. Padelford, of Minneapolis, Minn., is about to engage in the garage business in Roseburg, Ore. A building, 80 x 100 feet, is being erected for him.

The Motor Truck Corporation has been organized in Washington, D. C., and is located at 1719 H street N. W. It will handle Alco and Little Giant trucks.

The Auto Tire Service Co. has commenced business in Passadena, Cal., with

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R. A. Thompson as manager. It is located at 13 South Garfield avenue.

E. A. Bennett, in Washington, D. C., has formed the Crawford Automobile Sales Company and will handle Crawford cars. His quarters are at 1615 O street N. W.

M. E. Humbarger and Samuel Hoover, of Toledo, Ohio, have formed the Collingwood Sales Co., and will sell Apperson cars. They have not yet secured a location.

R. C. Hathorn, formerly an employe in H. A. Perkins & Co.'s garage in White Rover Junction, Vt., has bought out his employers and will continue the business.

T. W. Thompson has purchased the G. A. Bull garage in Santa Cruz, Cal. The sale takes with it the agency for Overland, Kissel, Maxwell, Stoddard-Dayton and Reo cars.

The Locomobile Co. of America has established a branch in San Francisco, which is in charge of J. M. Page. It is located in temporary quarters at 942 South Grand avenue.

Charles A. Malley, who recently resigned from the King Motor Car Co., of Detroit, has secured the New England representation for the Universal truck and is preparing to open a salesroom in Boston.

The Kansas City Garage Men's Association has been organized with the following officers: President, B. B. Huckell; vice-president, Charles Brooke; secretary, Myran Albertson; treasurer, P. D. Warshner.

The Williams Automobile Co., agents for Metz cars, which has been doing business at 343 Trumbull street, Hartford, Conn., has removed bag and baggage to Bristol, in the same State. Its Bristol address is 49 Church street.

T. A. Vernon, in Salem, O., has sold his interest in the Vernon and Seran Garage to the Salem Auto and Repair Co. E. A. Seran is manager of the new combination. Vernon, however, retains the agency for Everitt cars.

Lee D. and Burton L. Jamieson, in Toledo, O., have taken the Oldsmobile agency for Northern Ohio and are erecting a two-story brick building in Huron street for their business. They will operate under the firm style Jamieson Bros.

W. E. Wood, of Holyoke, Mass., for some time connected with the Farr Alpaca Co., is, with Frank Lamont, of Springfield, preparing to open a garage in Palmer, Mass.

M. B. Crosby has started an automobile and repair business in Calais, Me.

F. Carleton Dole, of Worcester, Mass., who is described as an automobile salesman, has filed a voluntary petition in bankruptcy. He schedules liabilities of $22,497, of which $20,997 is unsecured. He places his assets at $50.

The Louisville Lozier Co., has commenced business in Louisville, Ky., at 708-712 West Broadway. Howard Lothrop, of Detroit, is manager, and H. M. Martin, of the same city, is in charge of the service department. Lozier and Pullman cars will be handled.

The H. E. Wilcox Motor Co., of Minneapolis, has established a branch in Kansas City, at 1325 Walnut street, which will have charge of the distribution of Wilcox trucks in the entire Southwest. R. E. Chamberlain, assistant sales manager of the company, has assumed charge of the branch.

The International Motor Co., maker of the Mack, Sauer, and Hewitt trucks, has established a branch in Washington, with offices and salesrooms at 811 Seventeenth street N. W., and a service department at Fifteenth street and Ohio avenue. John S. Larcombe, Jr., is in charge as manager.

Myer Abrams & Co., of Boston, who have been prominent in the New England horse trade, have embarked in the motor truck business, handling the Lauth-Juergens truck. J. J. Gormley, who formerly was connected with the Lozier branch in Boston, has been engaged to manage the truck department.

The Federal Rubber Mfg. Co., of Milwaukee, has established branches in St. Louis and Minneapolis. The former is in charge of L. E. Allmon, at one time manager of the Frey & Magill Motor Supply Co., of Denver. The manager of the Minneapolis establishment is E. S. Johnson, who will have the title northwestern sales manager.

Four new automobile buildings are going up on the old Luna Park property in Pittsburgh, Pa. They are of iron and reinforced concrete and will house the Franklin Automobile Co.'s branch, the White agency, the Goodrich tire branch, and the International Motor Co. Each will be 48 x 128 feet and is expected to be ready for occupancy September 1.

Carrigan Bros., of Los Angeles, Cal., who for several years have been agents for the Midland and Pratt-Elkhart cars, have retired from the business. In conjunction with W. A. Peck, who formerly was connected with the Midland factory, they have organized the Carrigan-Peck Mercantile Co., which will do a general merchandising business in Los Angeles and the surrounding country.

M. C. Harvey, of Tampa, Fla., is endeavoring to organize what will be styled the Tampa Auto Supply Association. It is designed to prove one of those co-operative organizations, which will supply owners with accessories at trade prices, or thereabouts, in return for a fee of $5 per year. He has opened an office in the Greeson Theatre Building in order better to prosecute the undertaking.

The Universal Motor Truck Co. of New York, which has had the metropolitan agency for the Universal truck, has been taken over by the parent Detroit company and henceforth will be operated as a factory branch. F. K. Parke, of the parent company, has become president of the New York corporation, of which H. H. Walton, former president, is vice-president and general manager. Samuel Mann is treasurer and George Wheeler secretary.

On the petition of the Wabash Realty & Loan Co., the Central Trust Co. of Indianapolis, has been appointed receiver for the Indiana Automobile Co., of that city. Crawford Fairbanks, a Terre Haute brewer, is president of the Realty company and one of the principal owners of the automobile concern and is named as a defendant in the suit. It is alleged that the automobile company owes the plaintiff $8,000 on a $10,000 note, made January 9, 1907, and endorsed by Fairbanks. The debts of the company are said to mount high, but it is claimed that it has property enough to cover its indebtedness. According to one of those concerned, the suit is a friendly one, which probably will result in winding up the Indiana Automobile Co.

Changes Among Prominent Tradesmen.

H. E. Partridge, for several years connected with the Boston branch of the Ford Motor Co., has been transferred to the Ford branch in Buffalo, of which he has become the manager.

George H. Brown, who recently engaged as manager of the Century Electric Motor Car Co., of Detroit, has resigned that office. He has taken a position with the Mather Spring Co., of Toledo.

W. H. Campbell, the one-time chief engineer of the Willys-Overland Co., who last month became identified with the engineering staff of the Flanders Mfg. Co., has resigned from the latter company. He has another iron in the fire.

George Waller, who previously was connected with the Argo Electric Vehicle Co., of Saginaw, Mich., and prior thereto with the Regal Motor Car Co., of Detroit, has been appointed Michigan branch manager for the Ignition Starter Co. He will have charge of the Disco sales in the State of Michigan, including the city of Detroit.

John W. Hill has been appointed "sales engineer" for the Bantam Anti-Friction Co., of Bantam, Conn. Until recently Hill, who is a mechanical engineer, was connected with the Browne & Sharpe Mfg. Co., of Providence. Previous thereto he had experience with the General Electric, Westinghouse and American Locomotive companies.

Recent Losses By Fire.

Duluth, Minn.—Cadillac Automobile Co., damaged. Loss $40,000.

Jenkintown, Pa.—John S. Newbold's garage, damaged. Loss, $2,500.

Great Falls, Mont.—Montana Motor Car Co.'s garage, damaged. Loss, $46,000.

Boston, Mass.—Hub Automobile Co., 93-97 Freeport street, building damaged. Loss, $20,000.

New York City—H. Lambert's garage, Central Park west and 100th street, partly destroyed. Loss $20,000.

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Portland, Ore.—Rex Auto Co., under Oregon laws, with $1,000 capital; to deal in motor cars.

Sacramento, Cal.—Pan-American Motors Co., under California laws; to deal in motor cars. Corporators—F. W. Cole and others.

Cleveland, Ohio—Alco Motor Car Co., under Ohio laws; to deal in motor cars. Corporators—E. L. Graves, O. R. Michael and others.

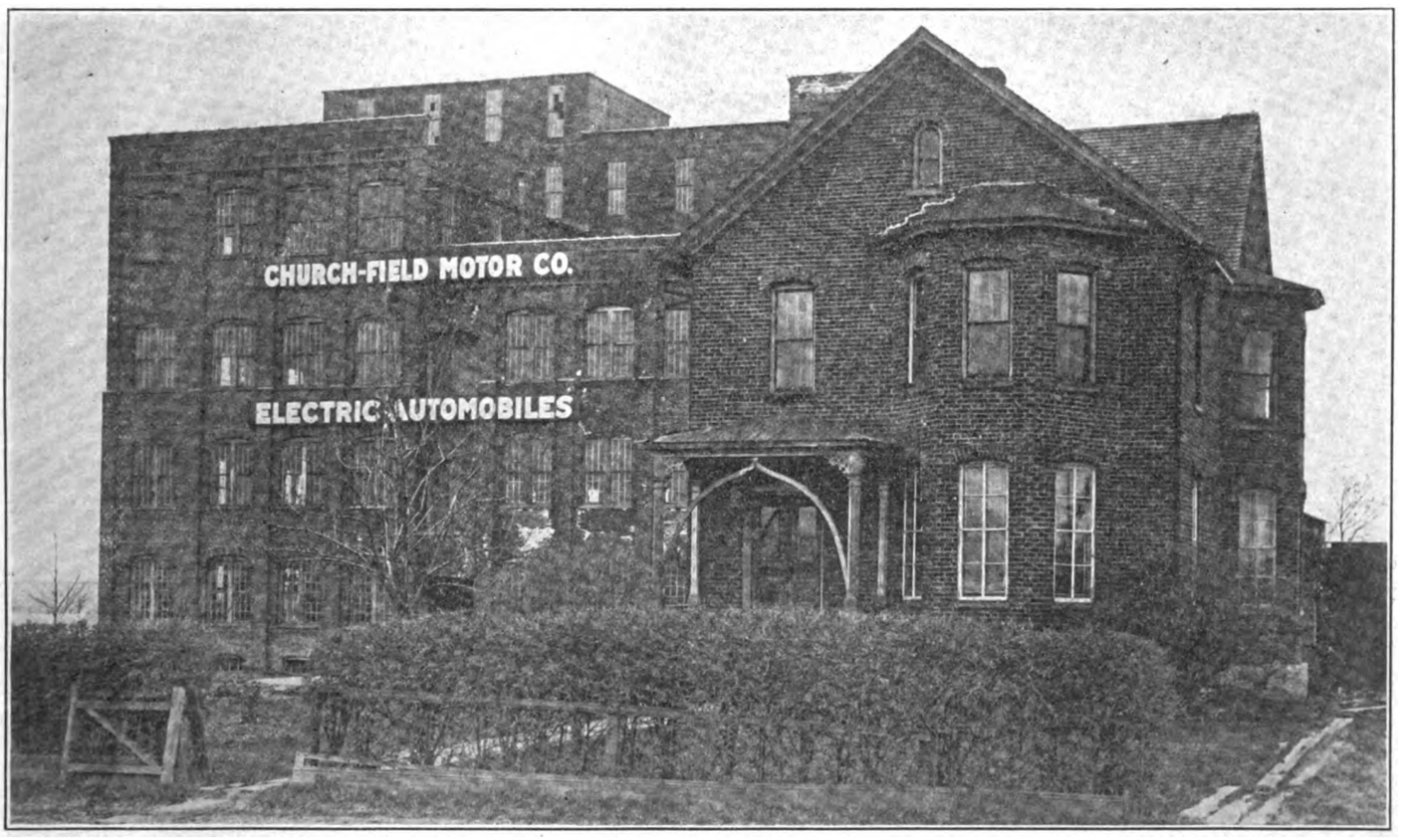
Glover, Pa.—Glover Automobile Co., under Pennsylvania laws, with $5,000 capital; to deal in motor vehicles. Corporators—Edward Glover and others.

Staunton, Va.—Augusta Motor Co., under Virginia laws, with $10,000 capital; to deal in motor cars. Corporators—J. H. Allen, Rufus Taylor, J. W. Childress.

Alexandria, Va.—Hercules Truck Co., under Virginia laws, with $100,000 capital; to operate a garage. Corporators—C. H. Smith, Jr., C. K. Huthsing, Samuel Broadbent.

Indianapolis, Ind.—Indiana Tire Filler Co., under Indiana laws, with $25,000 capital; to manufacture tire filler. Corporators—R. C. Ellis, F. T. Mitchell, H. H. Woodsmall.

Albany, N. Y.—Allen & Arnink Auto Renting Co., under New York laws, with



FACTORY AT SIBLEY, MICH., IN WHICH CHURCH-FIELD ELECTRIC CARS ARE PRODUCED

Omaha, Neb.—R. H. Bloomer Co., under Nebraska laws, with $25,000 capital; to deal in motor cars. Corporators—R. H. Bloomer and others.

Hartford, Conn. — Stoddard-Dayton Motor Co., under Connecticut laws; to deal in motor cars. Corporators—Walter D. King and others.

Grand Forks, N. D.—Lyons Auto Co., under North Dakota laws; to deal in automobiles. Corporators—J. W. Lyons, M. L. Lyons and others.

Burlington, Ind.—Burlington Auto Traction Co., under Indiana laws, with $5,000 capital; Corporators—L. O. Dunn, Zora M. Dunn, Laura B. Dunn.

deal in motor vehicles. Corporators—S. W. Woodward, O. Ducker, E. S. Parker.

Indianapolis, Ind.—Roby Carburetter Co., under Indiana laws, with $10,000 capital; to manufacture carburetters. Corporators—F. S. Roby, C. J. Schuh, E. D. Salsbury.

Xenia, Ohio—Central Garage Co., under Ohio laws, with $5,000 capital; to operate a garage. Corporators—Jacob Baldner, C. K. Wolf, A. C. Messenger, F. F. McLain.

Boothbay Harbor, Me.—Lewis Garage Co., under Maine laws, with $10,000 capital; to operate a garage. Corporators—J. Edward Knight ,Eben T. Lewis, C. R. Lewis.

St. Louis, Mo.—Dilke Garage Co., under Missouri laws, with $2,000 capital; to

$5,000 capital; to rent automobiles. Corporators—William G. Allen, 105 Fourth avenue; Henry Arnink and Bertha H. Arnink, both of 316 Orange street.

Chicago, Ill.—Hollywood Garage Co., under Illinois laws, with $5,000 capital; to operate a garage and repair shop. Corporators—Clarke M. Cavenee, W. F. Olds, B. A. Schuster.

New York, N. Y.—Federal Trucking Co., under New York laws, with $20,000 capital; to manufacture and deal in motors. Corporators—Donald B. Abbott, 129 Gates avenue, Brooklyn; Joseph D. Frackenthal, 71 Brooklyn avenue, Brooklyn; James L. Kauffman, Brooklyn.

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WEED AGAIN "TIES UP" CHANNON

Secures Sweeping Order Restraining Production and Sale of Anchored Tire Chains—Atlas Chain Also Affected.

Having obtained an injunction in Wisconsin restraining a purchaser from using tire chain parts made by the H. Channon Co., of Chicago, the Weed Chain Tire Grip Co. returned to the United States District Court for the Northern District of Illinois and took action against the Channon company itself. In that court a suit already was pending for infringement of the Parsons-Weed patent, but by this move, which was made last week, the Weed people succeeded in securing a new preliminary injunction order which effectually ties up the Channon output of tire chains and parts until the main issue is decided.

The order, which was granted by Judge Sanborn on Thursday last, 25th ult., directs that pending the determination of the suit the Channon company, or anyone connected therewith, shall not make, sell, use or cause to be made, sold or used tire chain grips infringing the Parsons' patent for parts thereof, or parts or material adapted and intended for use in connection therewith, and from otherwise infringing or contributing to the infringement of said letters patent; and "in particular from making, selling, using or causing to be made, sold or used the Shero, Gripwell, Rufshod, Zig-Zag or other chain grips" of similar types, whether the grips are provided with straps or extra lengths of leather or chain whereby they may be anchored on the wheel, or whether or not such grips be sold with instruction sheets or notices advising or directing a purchaser to "anchor" them to the wheels by such straps or extra pieces of chain or leather.

This order of Judge Sanborn answers the several defenses which have been made by the Channon company which, in August, 1911, was enjoined from infringing the Parsons-Weed patent, but which later in the year challenged the Weed company by placing on the market the Rufshod, Gripwell and Zig-Zag grips, and offering them for sale with extra pieces of chains, which were called "anchors," and which were designed to prevent the tire chain from creeping on the wheel. It also sold parts of tire chains, announcing that they were to be used only for the manufacture and repair of grips that were provided with "anchors," in the belief that by giving such notice its tire chains and parts could not be treated as an infringement of the Parsons-Weed patent.

Judge Sanborn, however, repeated his ruling made in a previous suit against another company, to the effect that the furnishing of the "anchors" was "simply a subterfuge to evade the rights of the patent owner."

Not the least interesting feature of the proceedings before Judge Sanborn was the introduction by counsel for the Channon company of a modified form of Atlas grip, which he stated the Atlas Chain Co., of Brooklyn, N. Y., was about to place on the market, and as the Channon company wished to sell it he asked the court to so word the injunction order as to exclude the proposed Atlas grip from its operations. This the court declined to do, however, not only granting the order in the sweeping form, as stated, but expressly saying that it did include the modified form of Atlas grip exhibited.

Court Dismisses Rose's Patent Suits.

For lack of prosecution, the suits instituted by the Rose Mfg. Co., of Philadelphia, against the Emil Grossman Co. and eleven other New York concerns for alleged infringement of the patents covering the Never-Out license plate holder, have been dismissed by Judge Mayer, sitting in the United States District Court for the Southern District of New York, in which the action was instituted in December last. The twelve defendants entered prompt appearance to the Rose suit and later filed a demurrer, but as the Rose company failed to argue the demurrer, or alter its complaint, or take any other action, Judge Mayer dismissed the suits but placed the costs on the defendants. The defendants who were joined in the complaint and in the defense are as follows: Emil Grossman, Emil Grossman Co., Eclipse Specialty Co., National Sales Corporation, Motor Car Equipment Co., Gus Balzer Co., American Auto Supply Co., Lowe Motor Supplies Co., J. Alexander Mfg. Co., John J. Treacy and George F. Connelly (trading as Universal Auto Supply Co.), William Wooster (trading as Automobile Surplus Stock Syndicate), and Joseph H. Parsons.

To Build Fisher Bodies in Canada.

To reproduce on Canadian soil the well-known Fisher bodies, the Fisher Body Co., Ltd., of Canada, has been organized with $150,000 capital stock and will locate in Walkerville, Ont. It already has acquired a four-acre site in that city, on which will be erected a brick plant which it is expected will be ready for occupancy about July 15th. The incorporators are: Fred J. Fisher, Charles T. Fisher, L. Mendelssohn and A. Mendelson, who will be the principal stockholders and who also are the principal stockholders of the Fisher Body Co., of Detroit.

Tall Yarn of Daimler American Plant.

Although press dispatches state that the parent Daimler company in Germany has completed negotiations for a plant in Niagara Falls, N. Y., officials of the Daimler Auto Import Co., of New York, state that they know nothing whatsoever regarding the matter and take no stock in the report. They say that it is wholly unlikely that a Mercedes factory would be established in this country without their knowledge.

GARDEN SHOW IS NOT YET ASSURED

Broad of Trade's Exclusive Contract With Grand Central Palace a Factor in the Case—Existing Situation.

Routine business only was transacted at the regular monthly meeting of the Automobile Board of Trade, which was held yesterday at its New York offices. The matter of shows and the forthcoming conference of sales managers, which it is well settled will occur during July, were discussed, but the discussion developed little of general interest.

While it is practically assured, the projected amalgamation of the Board of Directors with the National Association of Automobile Manufacturers did not enter into the considerations of the meeting, as the conference committees of the two associations have not yet outlined the necessary plan of action.

Subsequent to the meeting of the Board of Trade directors, however, the Association Patents Co., which is the legal repository for various patents owned by its members, held its annual meeting, at which these officers were elected; Charles Clifton, president; C. C. Hanch, vice-president, and Alfred Reeves, secretary-treasurer.

The Board of Trade show committee, Col. George Pope, Alfred Reeves and M. L. Downs, also convened, and as a result it is known that despite statements to the contrary the Board of Trade has not yet taken a new lease on Madison Square Garden for show purposes. The new owners of that building, who will perpetuate its existence for another year, at least, have invited the Board of Trade to hold a show in the famous structure next January, but there are several serious formalities to be observed before any lease can be executd. Ultimately the building may be used, but if so it will be due to the grace of the lessees of Grand Central Palace, with whom the Board of Trade has an exclusive contract.

If the projected merger of the A. B. T. with the N. A. A. M. is brought about, the former will promote all shows, in which connection it transpires that at least one of the good and sufficient reasons why the show in Grand Central Palace last January was held under the auspices of the N. A. A. M., although the Board of Trade held a lease of the building, was due to the fact that the latter organization had an exclusive contract with Madison Square Garden authorities which required that the organization confine itself to that building.

Picard Gets Gray & Davis Account.

Having discontinued their New York branch, Gray & Davis, Inc., of Boston, Mass., have transferred their account to the A. J. Picard Co., of New York, who have been handling the goods on an agency basis.

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THE MOTOR WORLD

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DEMAND THAT OVERWHELMS ENGINEERS.

It has long been an axiom that the public must be given what it wants, and the motor car business is no exception to the rule. If a manufacturer insists upon building something the public does not want, he is reasonably sure to join the ranks of the commercially unsuccessful, regardless of the intrinsic merits of his product. Were the public gifted with engineering discretion the situation would be different; but unfortunately it is true that prejudice or lack of knowledge, or both, sometimes cause the suppression of designs which, though actually of no little merit, require such development as is impossible without the active co-operation of those who buy.

A well known motor truck engineer cites, as a case in point, the horizontal motor with two opposed cylinders, stating as his own experience that a commercial vehicle with a motor of this type can be manufactured and sold at a price considerably lower than that of a four-cylinder car of the same power and carrying capacity and of the same quality, and that his two-cylinder machine was the most satisfactory, regardless of price considerations. But a combination of circumstances which included the unsatisfactory performance of many other makes of motors of this type and the increasing leaning toward four-cylinder motors, made it impossible to sell enough of these cars to justify their production, and it became necessary to refuse repeat orders from previous purchasers.

While in many cases the difficulty of properly distributing the mixture to the cylinders and of lubrication has been underestimated by manufacturers, to the evil repute of this type, other makers have been successful in solving the problems and making the most of the compactness and other good features of the opposed cylinder engine; but the handicap has been too heavy, and even in small commercial cars the four-cylinder motor is far in the lead.

While it is a matter of regret to engineers that the lay public, comparatively uninformed, should wield so much power, there is some consolation in the fact that a really good thing rarely can be permanently suppressed. It is probable that in time the public will become educated, if not to the point of technical proficiency, at least to an appreciation of the judgment of highly trained engineers, and that much that now is kept out of sight because it is not the fashion will be brought to light and its latent advantages fully developed.

HILL CLIMBING FOR PHOTOGRAPHIC PURPOSES.

Publicity undoubtedly is a good thing; assisted by photographs, publicity oft-times is made better and more emphatic; but it is unfair, to say the least, to misrepresent a machine's ability, whether by direct statements or by photographs which are deliberately "manufactured" to make a car appear to be doing that of which it is incapable. Such things are reactionary in their effects, for it is difficult to accept without question any statement or claim made by an agent making use of photographic misrepresentations. Furthermore, the attempted deceit almost invariably is uncovered, in many cases by the carelessness of the perpetrators themselves.

The trick of tilting a photograph to make a level look like a hill or a hill look steeper than it really is is not new, but it has given way to more elaborate work, such as hoisting a car half way up an impossible bank with block and tackle and photographing it, afterward painting out the hoisting gear; or blocking the wheels with stones which subsequently are obliterated from the picture, so that the car can be represented as climbing the grade under its own power. But paint can be, and often is, washed off, disclosing the fake, and the photographs actually have been sent out—and are being carefully preserved—in which the rocks under the wheels have been left just as they were photographed, in mute contradiction of the spirited caption written on the back of the print. In one case the obliterating artist carefully covered the hoisting ropes with painted foliage, but left the big pullies and hooks sticking straight out in front of the forward axle, under the impression that they were part of the car. Such a crude method as cutting a car out of one photograph and pasting it in a startling position in another is not uncommon, but is easily detected owing to the peculiarly sharp outlines.

While pictures of cars climbing at angles of 45 degrees—100 per cent.—may attract a few gaping stares, and possibly the attention of an intending purchaser, they are sure to do much more harm than good in the end, and it is inconceivable that their use should be sanctioned by responsible officers of motor car companies. But while it may be somewhat difficult to keep some press agents down to prosaic facts, it is unnecessary to do more than tell the truth about a really good machine in order to interest those whose interest is worth attracting. And while the misleading photograph is not by any means in general use, and its use is not confined to America, there is no good excuse for it at all.

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GASOLENE GOES UP ANOTHER CENT

Fourth Increase Makes Advance of 44 Per Cent. Within Six Months—"Reasons" That Do Not Explain.

The price of gasolene has gone up another cent and now stands at 13 cents per gallon delivered at garages. The Standard Oil Co. made the advance on Thursday last, 25th ult., and the Texas Co., an independent, at about the same time. It is the fourth increase that has been made within six months, the price late last fall being 9 cents. Little satisfactory information regarding the reasons for the advance of 44 per cent. in less than half a year is obtainable. At the offices of both the Standard Oil and Texas companies, they talk sagely of supply and demand governing prices, but nowhere is it possible to discover that the supply has decreased or the demand increased to an extent even mildly approximating 44 per cent.

According to several explanations made by J. I. C. Clark, the official medium between the Standard Oil Co. and the public, Providence and the automobile are to blame—the former because the supply of crude oil has fallen off; the latter because the demand for gasolene has increased.

"Supply and demand," said Clark on Friday last, when asked why the increases had been made. "Good crude oil, yielding a good per cent. of gasolene is falling off in quantity of production and the demand for gasolene is increasing. It has increased ever since the automobile industry began to grow and is still increasing."

Mr. Clark was asked if the raises were not arbitrary, if they were not a recuperation resultant upon the recent difficulties of the Standard Oil Co. with the Federal government.

"No," he reiterated; "it is simply because of supply and demand."

"Has the demand increased so greatly within the last few months as to warrant the increases that have been made, and has the supply fallen off so markedly as is indicated in the recent advances?" he was asked.

"There must be fifty automobiles a day made in the United States," vouchsafed Clark, in an inquiring tone.

He was informed that his guess was well within the limit and that one manufacturer alone has announced his intention of building 75,000 cars this season.

"Is that so?" remarked the oil man, with a tinge of astonishment in this tone.

Asked for facts as to production, methods of manufacture, manners in which prices are made and other data connected with the making of gasolene, Clark explained the system and gave his reasons for the change in supply.

"There are several oil fields," he said. "These produce crude oil, a substance something like molasses, which is taken from the earth, out of wells. This oil is the basis of gasolene, kerosene and other similar products. The crude oil is piped to refineries and is distilled. The first of the products which comes off during distillation includes gasolene; after that comes kerosene and the others.

"It is singular," he added, "but the Pennsylvania and West Virginia field produces the best grade of crude oil and this field was the first discovered.

"There are other fields in Texas, Mexico and California. I do not know just what will be our production of crude oil this year. Last year I believe it was something like 218,000,000 barrels. Although gasolene and crude oil have been increased in price the comparative production will probably appear inconsistent in that it may be greater than the supply of last year. This, however, is because the quality of the crude oil is not as good as was that of last year. The Pennsylvania field, of which that in West Virginia is a part, gives the best oil and the percentage of gasolene obtained from a good grade of the crude product will run from 8 to 10 or 12 per cent. With the falling off in the quality of the eastern oil the southwestern fields are called on to help out and the oil there is not of as good quality. The per cent. of gasolene obtained in that part of the country is, I should say, 3 or 4 per cent.

"Thus you can see that if the eastern fields show the greatest falling off in production and the gasolene has to be extracted from the Texas and other oils of that section the crude oil production may be large but the quantity of gasolene may be lessened."

"How are prices fixed and who fixes them?" the Standard Oil publicity man was asked.

"That is done by the refiners," he said. "They know the conditions and know how the supply compares with the demand. If they find there is a great call for a product and that they are not producing as much as formerly or as much as they should produce to equalize matters, they are able to ascertain the relations between the supply and demand."

"But the refiners do not fix the price of gasolene, do they?"

"No," responded Clark, "I suppose the board of directors passes on all such matters."

"Is it not true that the increases may have been arbitrary because of the recent trouble of the Standard Oil Co."

"O, no," was the answer, "that is not the case. As I stated before, the demand has increased and the supply has fallen off."

"But here's a thing," almost exclaimed Clark, "that people who write about these things seldom say anything about: Whenever the wholesale price goes up a cent the retailer or garage man raises his prices about two cents. In any ordinary business if a man can make a profit on a commodity of 25, 40 or 50 per cent. he thinks it is pretty good but the garage men sell gasolene for about twice as much as they pay for it. They make 100 per cent. profit. I have a friend who lives in New Jersey and he has a tank near his garage. He can buy gasolene from a Standard Oil wagon for 13 cents, but when he comes to New York and buys it of a garage he has to pay 22 cents."

"But," interrupted the Motor World man, "is there a prospect of another raise in the wholesale price?"

"I really can't tell," said Clark. "There are some things I can't find out myself.

"And about this Texas raise," he continued, "I am connected with the Standard Oil Co. of New Jersey, and so do not know anything about the affairs of the Texas company or the New York company."

"How about lubricating oil? Is that going up?"

"That I don't know, either," was the oil man's answer. "I often try to find out things like that, but there isn't anyone around here who will give me such information."



April 29-May 4, Burlington, Vt.—Burlington Merchants' Protective Association's annual show in State Armory.

May 4, Santa Monica, Cal.—Santa Monica road race.

May 18, Washington, D. C.—Sociability run of the Washington Automobile Club.

May 25, Newark, N. J.—Motor truck parade under the auspices of the Newark Automobile Dealers' Association.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

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DOW TO TRY EIGHT-WHEEL TRUCK

New Yorker Acquires Rights Under Molesworth Patent and Will "Feel" Market —Odd Positioning of the Wheels.

Unless the signs fail, or the experiments which soon are to be made do not correspond to the sanguine expectations of the inventor and the performanec of models, the commercial vehicle field soon will be invaded by a brand new type of motor truck which it is expected will mark a distinct era in the industry. The Dual Wheel Co., which was incorporated last week under New York laws with $300,000 capital, and of which Alexander Dow is the moving spirit, will produce the vehicles, which will be distinguished as among the first of their kind to be equipped with eight wheels instead of the usual four. The patents under which the vehicles will be produced were issued several years ago to Guilford L. Molesworth, whose mechanical engineer's "pocket-book" is more or less well known to the engineering fraternity, and have been purchased by the Dual Wheel Co.

When seen by a Motor World man, Dow would not predict when the vehicles might be expected to put in an appearance, though he explained that work on an experimental vehicle would be commenced shortly with which to feel out the market and determine whether a demand for the truck could be created. The purpose of the unique construction of the vehicle is two-fold. It is expected to eliminate skidding—it is given out that Molesworth's real efforts in originating the design were to produce a vehicle that would not skid under the most adverse conditions—and also to reduce vibration due to uneven road surfaces to the minimum. To these ends, each axle carries two wheels at each extremity instead of one, the two wheels of each pair being mounted close together at the ends of a short spindle arranged at right angles to the main axle. Consequently the spindle becomes as a lever of the second class, whose arms are of equal length. The construction follows closely that which has been used for a number of years in Pullman cars, in fact, the theory being that as one of the wheels of a pair mounts an obstruction the other remains on level road and the total vertical movement of the truck frame is reduced by one half. It is pointed out that as dual rear tires are the rule rather than the exception anyway they might better be placed on separate wheels and advantage taken of the principle which has been outlined.

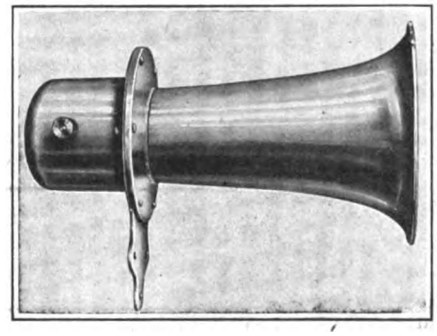
Cut-Out Tabooed by Scotland and Ireland.

Following the example set by the authorities in London, both Scotland and Ireland have promulgated orders prohibiting the use of the exhaust cut-out. In Scotland, the secretary issued the order, which went into effect last week, and in Ireland the local government board followed suit. Both orders are framed along the same general lines as the one which now is in force in London.

Fitzgerald Takes Up Horn Manufacture.

There are many persons who, while appreciating the desirable qualities of motor car signal horns of the type in which sound is produced by the mechanically induced vibration of a diaphragm, hesitate to buy because of the necessarily high price of some of these devices. This state of affairs has resulted in the production of horns of simple construction and low cost, the most recent of which is one that has been designed by the Fitzgerald Mfg. Co., of Torrington, Conn., well known as manufacturers of sheet metal articles, spun brass and copper-asbestos gaskets.

The new horn has the distinctive outward appearance of its class, and the actuating



FITZGERALD'S ELECTRIC HORN

mechanism is of the utmost simplicity, consisting of a pair of electro-magnets which, when energized by a current from a battery, set up rapid vibrations in an iron armature to which is connected the tapper or hammer which strikes the steel diaphragm. The operating mechanism has all the simplicity of the "works" of an ordinary electric bell, and is thoroughly protected from dust and dampness by a spun brass cap held in position by four screws; when this cap is removed all the working parts are exposed. The diaphragm is securely held between a flange which forms the base of the horn and a plate which is extended at one side to form an attaching bracket; these parts are securely riveted together so that there is no danger of their coming apart. The simplicity of the horn will enable the makers to sell it at a low price, and the same characteristic feature makes for long life.

Factory Secured for Sewell Wheels.

Having increased its capital from $60,000 to $300,000, the Sewell Cushion Wheel Co., of Detroit, of which H. J. Sewell is president, has acquired a new factory in that city, of which it will take possession this week. It is located at the corner of Tenth and Fort streets, and will permit the really serious manufacture and marketing of the cushion wheel which bears Sewell's name.

DIESEL TRUCK ENGINE IS COMING

Famous Inventor, Now Visiting America, Makes the Assertion — Dissipates Notion Regarding Weight of His Motor.

That there are not only abundant possibilities of the ultimate development of the Diesel engine to the point where it can be successfully employed for road vehicle propulsion, despite the general impression to the contrary which prevails, but that its actual employment for such work may be looked forward to as an accomplished fact of the very near future, is the assertion of Dr. Rudolph Diesel himself, who invented the engine which bears his name and who has labored long and persistently to bring it to its present state of perfection.

"Within a year," said Dr. Diesel to a Motor World man in an interview at the Hotel Manhattan in New York City yesterday, "or a year and a half at the outside, the Diesel engine will be used as the motive power for commercial vehicles for road use." And anyone who could look into Dr. Diesel's bright blue eyes and sense his indomitable perseverence and his remarkable proclivity for forging ahead in the face of setbacks that would cowe the ordinary mortal would have little reason to doubt the outcome of the asseveration.

In appearance, Dr. Diesel, who is a doctor of engineering and of science and a director in the Verein Deutscher Ingenieure, suggests but little his German origin. Of medium height and inclined to spareness, his clear-cut features are rather those of the successful merchant. His blue eyes, continually alert, peer through gold-rimmed spectacles, and he possesses the faculty which has been remarked in so many other persons of inventive genius of perceiving without the necessity for lengthy explanations the gist of the business in hand. In diction, his English is perfect, as becomes a man of eminence throughout the civilized world, though it is spoken with a decided Teutonic accent that is not without charm. His willingness to talk, and to make certain that nothing is misunderstood, is in marked contrast to the reticence of many another person of considerably less importance.

"As to whether or not the Diesel engine will be employed in the near future for the lighter types of pleasure vehicles," he continued in response to a query, "I cannot say, though there is no reason why it should not be so employed. But that it will be used, and very much sooner than generally is supposed, for commercial vehicles there is no question; it is a certainty. It is no longer a question of whether it can be done or not; it is simply a question of when I can get at it to complete the work. At present I have not the time. So much of my time is taken up with the larger motors—motors for ship propulsion principally—and with locomotive work, that I

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can do little else at present or in the immediate future."

"But it has been said that present types of Diesel engines are entirely too heavy and cumbersome for automobile work. Is there any truth in the statement?" asked the Motor World man.

"That is all wrong," replied Dr. Diesel. "There is absolutely nothing in it. The first engines undoubtedly were very heavy and even present types designed for stationary work are very heavy, but our high-speed engine, which but recently has been perfected is no heavier than the average automobile motor of the same power. I have at present under test a high-speed four-cylinder engine that develops 30 horsepower at from 600 to 800 revolutions a minute and it is not a bit heavier than the ordinary 30-horsepower gasolene engine."

"If the weight can be kept down as low as is necessary, what then constitutes the difficulty?" he was asked.

"There is no difficulty," he replied. "It is simply and wholly a question of getting at the work to make some very minor alterations and as soon as I can get time to attack it I intend to do so."

It is doubtful if there are many persons in the automobile and allied industries who are not familiar with the principle on which the Diesel engine operates—a principle, which, at the time of its discovery in 1897 was declared by gas engine experts all over the world to be absolutely new. The engines are built in both two and four stroke types and will burn any hydrocarbon from the very heaviest of crude oils to ilighter distillates. One of the later developments is that even animal and vegetable oils may be utilized for fuel, excellent results having been obtained with both castor and palm oils.

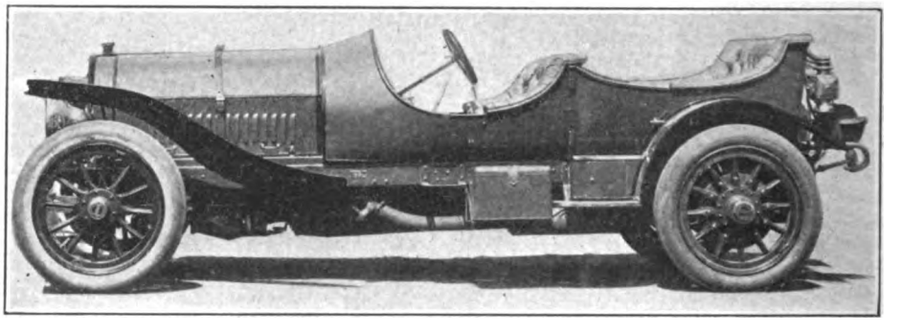
As has been stated, the cycle of operation of the engine is exactly the same as any other internal combustion engine. Instead of compressing a homogeneous mixture of fuel and air, however, only pure air is compressed. The compression is carried to the point where the air becomes sufficiently heated to ignite the fuel, which is pumped into the cylinder after compression is complete, the injection being continued during a portion of the working stroke. Thus ignition difficulties are eliminated and scavenging is most efficacious for the simple reason that it is effected with pure air and not with vaporized fuel and air.

All of which and a great deal more which was of a more or less technical nature was emphasized by Dr. Diesel at an illustrated lecture which he delivered before the American Society of Mechanical Engineers on Tuesday evening, 30 ult., the lecture being given under the auspices of the Gas Power Section of the society. Before the lecture, which was of importance, if for no other reason than that it marked the first time that Dr. Diesel has appeared to the American public, he was presented with a beribboned certificate making him an honorary member of the American organization.

VANDERBILT'S IDEA OF A BODY

Not Straight Lines but Sweeping Curves His Preference for Speed Cars—Unusual Design the Result.

At this time when the straight line motor car body is so distinctly the prevailing style, anything which has a fore-and-aft curve gets at least two glances, particularly when it is known that the designer's intention of avoiding straight lines by a reversion to pronounced curves was deliberate and at the behest of a man of great wealth and of more or less prominence in the world of fashion, as is the case with a body which has been built for the six-cylinder Alco chassis which W. K. Vanderbilt, Jr., drove as a raceabout last year and will be used this season with the new body. It is of the so-called tourabout type, having a low-seated tonneau, the design being worked out according to the ideas of the owner and, as the accompanying illustration shows, is marked by low-sweeping curves which cut the sides very low, in harmony with the low seats, the raked steering column and the general aspect of raciness that the car possesses. From the deep skuttle dash the lines dip backward so sharply and deeply that the sides are cut too low to make a door necessary for entrance to the front seat, and so no door is provided; the rear seat is reached through doors that are hinged on the forward sides. The usual running boards are replaced by small steps. A sharp lateral flare is given to the front fenders, the front ends of which are narrowed somewhat, still further increasing the unusual appearance of this unusual car. Apparently the idea has been to produce a car which, while capable of carrying passengers in the rear seat, still is unmistakably intended for speed, and withal is reasonably comfortable and attractive in appearance.



VANDERBILT'S ALCO "SIX" EMBODYING HIS OWN IDEAS

Birmingham Buys Motor Fire Apparatus.

The enterprise which has within late years characterized the city of Birmingham, Ala., and which has led that city to style itself the "Pittsburgh of the South," has cropped out in a new channel and the city now is claiming to have the largest number of motor-driven fire-fighting machines of any city in the world. Birmingham has had sixteen motor-driven hose wagons, and with the addition of two more, scheduled for this week, the number will be eighteen.

Drove Without Glasses—10 Shillings Fine!

In Sydney, which is "overseas" in New South Wales, a motorist recently was arrested and fined 10 shillings because he neglected to wear spectacles when driving his car. Not that the particular magistrate who imposed the fine has a predilection for personal adornment in the form of glasses. When the driver applied for a license, according to the Motor Traffic Act he wore glasses. Later, the zealous police authorities "spotted" him driving along the public roads without them. Ergo: He was incompetent to drive, and though he excused himself with the plea that the glasses were undergoing necessary repairs, the magistrate was adamant and tacked on a further fine of five shillings because the driver had left his license at home as well.

Eye Doctor To Essay Six Months' Stunt.

As a result of a dispute between an eye doctor of Trenton, N. J., and a hardware merchant of Mount Holly, which also is in New Jersey, the eye doctor, H. Benton Young, expects to start in an automobile June 1st to do certain things within a certain time, and if he does them the hardware man, William B. Kumpl, is to hand over the snug sum of $5,000. The eye doctor is to travel from Maine to California and return within six months and to earn $10 in each town in which he registers, failing to perform which stunt he is to pay over $5,000 instead of receiving it.

Can't Alter Color of License Plates.

In Wisconsin the hideous contrast between the colors of many car bodies and the color of the State license tag evidently induced someone to believe that the Attorney-General of the State could grant permission to alter the plate to a color more in harmony with the car. The permission was asked for, at any rate, but the Attorney-General has denied the appeal and handed down a grave and solemn decision that the color of the license plate is a part of the official design.

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"CLASSY" FIELD FOR SANTA MONICA

Free-for-All Will Bring "Stars" Into Conflict—Two of Five Events Abandoned—Two Cars Questioned.

Undoubtedly, Los Angeles, which is another way of saying Santa Monica, will witness some great racing on Saturday next, 4th inst. But great though it may be, it will not be quite so great as was anticipated, for lack of entries required the abandonment of two of the five events which had been programmed. They are the 202-mile race for cars between 301 and 450 cubic inches, and the 252½-mile event for machines from 451 to 600 cubic inches. The three events which will be run are two class C events for non-stock cars, with piston displacements betwen 161 and 230 cubic inches, and between 230 and 300 cubic inches, which two events will be run over courses of 101.004 and 151.506 miles, respectively, and a class D event, a free-for-all number, over 303.012 miles, circuiting the course 35 times.

These three events filled fairly well, but as usual, the chief interest will attach to the free-for-all which will go for 303 miles, and in which Berna Oldfield will make his reappearance and measure pace with men of such reputation as Bert Dingley, David Bruce-Brown, Theodore Tetzlaff, Caleb Bragg, Ralph DePalma and Louis Disbrow. Earle Cooper, who is not unknown to fame on the Pacific Coast, and David Lewis, who still has a reputation to acquire, are the others who will line up in the big event.

Robert Evans and J. Tower, who are entered to start in the second class C non-stock car event, may not start—not for lack of desire on their part, but because, unless the technical reports made to the contest board of the A. A. A. are far wrong, the Flanders cars, which they are due to drive, are Flanders in name and outline, but not in engine. While the piston displacement of the Flanders stock model is 156 cubic inches, the displacement of these two cars, which have a bore and stroke of 4 and 4½ inches, respectively, is 226.2 cubic inches, just 45 per cent. greater than the displacement of the pistons of the stock car. Although the machines are entered in a non-stock car event, the contest board believes that strictly speaking, the cars cannot be construed as Flanders models.

The course covers a circuit of 8.417 miles, and, always fast, it has been so well groomed for the forthcoming occasion, that prophecy of the speed which is likely to be attained is neither safe nor easy. It is the same course on which last year Harvey Herrick, in a National car, made the world's record average of 74.628 miles an hour, circuiting the track 24 times and covering 202.008 miles in 162:24.60, and if anyone can better that pace, he surely will have to "go some," and a little more. The entries for the three events which make up the program for Saturday are:

Class C—Non-stock cars, piston displacement from 231 to 300 cubic inches; distance 151.506 miles; 18 laps:

Louis Disbrow	Case
Ralph DePalma	Mercer
H. A. Shain	Schacht
Joseph Nikrent	Case
Earle DeVore	Buick
R. Jeffkins	Mercer
Frank Siefert	Midland

Class C—Non-stock cars, piston displacement from 161 to 230 cubic inches; distance 101.004 miles; 12 laps:

H. C. Krause	Reo
Louis Nikrent	Buick
A. J. Charles	Ford
Victor Roschen	Ford
Robert Evans	Flanders
J. Tower	Flanders
George Joermann	Maxwell

Class D—Free-for-all; distance 303.012 miles; 35 laps:

Bert Dingley	Simplex
D. Bruce-Brown	Benz
Berna Oldfield	Fiat
Theodore Tetzlaff	Fiat
Caleb Bragg	Fiat
Ralph DePalma	Mercer
Louis Disbrow	Case
David Lewis	Stutz
Earle Cooper	Stutz

Jackson in Reo Wins at Fresno.

Consistent driving enabled Earl Jackson, at the wheel of a Reo, to outstrip the eight other contestants in the Fresno (Cal.) road race, which was conducted on April 21st by the Fresno Republican, and he crossed the tape at the end of the home stretch after having made an average speed of 49.59 miles an hour. The race, which was called a 200-mile road event, but which really figures out at only 197.4 miles, was run over a course of 14.1 miles and replete with sharp bends and bad places, so that the time, 3 hours 49 minutes, in which Jackson completed the 14 laps, is good going, considering that several stops were made necessary by a leak in the radiator. Second honors went to Thomas McKelvey in an Overland car; his elapsed time was 4:03.16, or at a rate of 48.68 miles an hour. Bruce Arent, in an Elmore, was the only other contestant to finish, his elapsed time being 4:30:53, 43.85 miles per hour.

The Buick machine, driven by Dentha Sulprizio, threw a tire while rounding one of the bends at a high rate of speed. The car turned turtle and the driver and his mechanician were thrown out and more or less painfully injured. Both were removed to the hospital, where it was found that their hurts were not of a serious nature.

For the "First Farmers' Automobile Tour."

In order to attract attention to itself, Farm and Ranch, a Texas agricultural publication, is promoting what is styled the "first farmers' automobile tour," which apparently will take the form of an endurance contest. It will occur during August next, and will include the principal cities in the State of Texas.

MIX ECONOMY AND "GUESSABILITY"

Philadelphians Finally Give Real Purpose to Their Annual Event—Jones Averages 22 Miles per Gallon.

Roadability contests, which more truly are "guessability" contests, and which originated in Philadelphia, were given a really useful and interesting turn on Saturday last, 27th ult., when the fifth annual guessability stunt of the Quaker City Motor Club occurred.

The interest and the usefulness were contributed by a fuel economy test which was made part of the contest proper, and despite unfavorable weather conditions, the run served to enable W. L. W. Jones, who piloted an American underslung car to achieve the impressive record of 61.3 miles with a consumption of only 2 gallons and 28 ounces of fuel, which figures out 22.07 miles to the gallon of gasolene. The car which Jones drove weighed 3,310 pounds and was equipped with a Rayfield carburetter, model 34. The car scored 9.51 points for general efficiency out of a possible 10, while those next in line, a Lenox, by William Fowler, and a Columbia, by H. O. Krause, scored 6.62 points and 6.53 points, respectively, their respective mileages from a gallon of gasolene being 13 and 13.38.

Of the 39 machines which left the Quaker City and splashed their way through the numerous water holes and mud puddles toward Atlantic City, but nine were entered in the economy contest. The mileage covered per gallon of gasolene for each of the entrants as shown by the official records is:

American, W. L. W. Jones	22.07
Lenox, William Fowler	13.00
Columbia, H. O. Krause	13.38
American, Ralph D. Earle	9.94
Flanders, H. DeGrout	18.55
Moon, E. A. Edwards	11.48
Michigan, T. R. H. DeAuelta	12.33
American, Nelson Shaw	13.33
Krit, Albert Rich	14.71

Unlike the method of determining the official time for the guessability side of the contest, which was resorted to last year, the time was this year determined by averaging the guesses of the 30 drivers who were entered in the contest, which worked out at 3 hours, 27 minutes and 15 seconds. Otto C. Fill, driving a Packard car, finished just 30 seconds later than the official time and thereby won the first prize. Second honors went to Charles J. Swain, whose Winton machine finished the run in 3:29.03, or 1 minutes and 48 seconds over the official time.

The prize for the first woman driver to finish in the sociability contest went to Mrs. W. Walter Harper, who drove a Case car. The route was from Philadelphia to Atlantic City. The cars were parked over night on one of the piers.

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BARS ONLY THE BOY CHAUFFEURS

New York's Attorney-General Interprets Reciprocity As It Relates to New Jerseymen—His Opinion In Full.

While New Jersey and Pennsylvania have managed to become embroiled over the rights of manufacturers' and other trade cars to enjoy the fruits of New Jersey's recently enacted reciprocity law, New York and New Jersey are at peace, and unless someone in New Jersey is disposed to espouse the cause of boy chauffeurs it is not likely that the relations between the two neighboring States will be unpleasantly affected.

The opinion of Attorney General Carmody, of New York, which was sought by interested New Jerseymen, effectually to remove all chance for friction unless, as stated, his ruling that as New York requires that chauffeurs shall be at least eighteen years of age, the sixteen-year-old chauffeurs who are licensed by New Jersey are not eligible to operate a car in New York, shall develop into a cause for "war," which state of affairs is extremely unlikely to come to pass.

Attorney General Carmody's opinion in full is as follows:

"First—As to the rights of motor vehicles owned by residents of New Jersey and registered under the laws of that state:

"Section 285 of our Highway Law, contained in the article relating to motor vehicles, provides as follows: 'The provisions of the foregoing sections relative to registration and display of registration numbers shall not apply to a motor vehicle owned by a non-resident of this state, other than a foreign corporation doing business in this state, provided that the owner thereof shall have complied with the provisions of the law of the foreign country, state, territory or federal district of his residence relative to registration of motor vehicles and the display of registration numbers thereon, and shall conspicuously display his registration numbers as required thereby. The provisions of this section, however, shall be operative as to the motor vehicle owned by a non-resident of this state only to the extent that under the laws of the foreign country, state, territory or federal district of his residence like exemptions and privileges are granted to motor vehicles duly registered under the laws of and owned by residents of this state.'

"From this provision it will be seen that a motor vehicle, owned by a non-resident, is exempt from registration here only to the extent that, under the laws of such state where it is registered, exemptions and privileges are granted to motor vehicles registered under the laws of this State.

"Under an act of the Legislature of New Jersey, approved April 2d, 1912, new provisions of law were adopted fixing the status of persons not residing in that state in regard to the registration and operation of motor vehicles. Section 7 of this law provided substantially that a motor vehicle belonging to a person, who was a non-resident of that State and who had registered the same and complied with the laws of the State in which he resided with respect to the registration of motor vehicles and a display of registered numbers, might be driven in the State of New Jersey for not to exceed a period of fifteen days in any calendar year. This is the extent to which, under the laws of New Jersey, exemptions and privileges are granted to motor vehicles registered under the laws of this State, and under the reciprocity section quoted similar privileges should be extended to motor vehicles owned by residents of New Jersey and there registered, and the same may properly be operated in this state for a period not to exceed fifteen days in any calendar year without registration here.

"Second—As to the rights of chauffeurs residing in New Jersey and registered under the laws of that State:

"In subdivision 4 of section 289 of the Highway Law is is provided that 'a non-resident chauffeur, who has registered under provisions of law of the foreign country, state, territory or federal district of his residence substantially equivalent to the provisions of this section, shall be exempt from license under this section; and provided, further, he shall wear the badge assigned to him in the foreign country, state, territory or federal district of his residence in the manner provided for in this section.'

"Although the phraseology of the statutes of the two States is divergent, I think that the requirements as to registration of chauffeurs are substantially equivalent. The New York statute provides that "the applicant shall pass such examination as to his qualifications as the Secretary of State shall require." (Highway Law, section 289, subdivision 1). The New Jersey statute provides that no person shall "be licensed to drive automobiles until such person shall have passed a satisfactory examination as to his ability as an operator." (Law of 1906, chapter 113, section 17).

"Although the New York statute permits the Secretary of State to prescribe the examinations, its purpose is to test the ability of the applicant as an operator of an automobile, and the intent of the two statutes is evidently the same in this regard.

"There is, however, a divergence between the laws of the two States in regard to the age limit of licensed chauffeurs, the limit in New York being eighteen years and the limit in New Jersey being sixteen years, as specified in the sections of the respective laws referred to. In this respect there is a marked difference, and I think that under a fair interpretation of subdivision 4, a chauffeur registered in New Jersey, if over the age of eighteen years, should be permitted to ply that vocation in the State of New York, but not if he is under the age specified by the New York law."

A. A. A. AND FEDERAL REGISTRATION

National Organization Alters Attitude and Grows Lukewarm—Congress's Maltreatment of Its Bill One Reason.

Several days since it became known that at the meeting of the executive committee of the American Automobile Association in Buffalo last week, a resolution was adopted which makes appear that the organization has executed a flip-flop in respect to federal registration, despite the fact that for several years it has been instrumental in introducing a bill into congress designed to attain that end.

The resolution recites that "in the opinion of the members of the A. A. A. executive committee a federal registration act is not only unnecessary at the present time, but against the interests of automobilists of the different states," and "that the imposition of an additional tax for federal registration would be unfair and unreasonable discrimination against users of automobiles, and that the passage of such a law would be most unjust." The resolution was framed by a committee composed of H. L. Vail, of Ohio, chairman; C. M. Robinson, of Connecticut, and John Wilson, of Pennsylvania. Ohio, incidentally, is one of the few states which persistently has opposed federal registration.

Officials of the A. A. A. are disposed to "fence" when their apparent about-face is questioned, but according to one of those high in authority who was present at the Buffalo meeting, the resolution was influenced somewhat by the passage of New Jersey's reciprocity bill and more largely by the fact that the A. A. A. federal registration bill has been so maltreated by congress that its fathers have difficulty in recognizing it. Congressmen Peters and Volstead, who took the bill to themselves, succeeded in having it so amended that instead of being optional, federal registration is made compulsory and drastic penalties, undreamed of by the A. A. A., have been interjected into the bill. The Peters and Volstead measures are now considered so undesirable that they no longer can claim the support of motorists. The A. A. A. resolution was framed and adopted as the result of a discussion of those two bills.

Texas Association Re-elects Baker.

George W. Baker, of Dallas, was chosen to succeed himself as president of the Texas Automobile Association, at the annual meeting of that organization, which was held on the 20th ult., at Waco. The thre vice-presidential chairs were filled by Dr. F. J. Fielding, of San Antonio; Captain J. W. Munn, of Galveston, and G. W. Hawkins, of Houston, respectively; C. H. Verschoyle, of Dallas, was elected secretary-treasurer. San Antonio was chosen as the place for the next annual meeting.

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LAMPS AND AUTOMATIC LIGHTING SYSTEMS

Investigations of Leonard Kebler That Indicate the Importance of Providing Reflectors That Correspond to the Size of Lamps in Use—His Views of Dynamo Output and Speed, Method of Drive, Battery Requirements and Wiring.

While the various units that go to make up a complete motor car electric lighting system have been discussed separately and in detail on many occasions, it is not often that the system as a whole has been taken up with particular reference to the harmonious proportioning of the various components. This, however, was done by Leonard Kebler, president of the Ward Leonard Electric Co., of Bronxville, N. Y., in a paper, entitled "What the Automatic Dynamo Lighting System Should Do," read at the April meeting of the Metropolitan section of the Society of Automobile Engineers. One of the points brought out by Kebler is that the storage battery used in connection with an automatic dynamo lighting system can be called upon to do, without damage to itself, considerably more work than could be expected of it if standing on a bench, for the simple reason that the constant vibration of the car dislodges gas bubbles, and the cooling effect of the rush of air also is beneficial. Another point emphasized is that electric lamp reflectors should be proportioned to the bulbs they are to use, as little is gained by using a powerful lamp in a reflector designed for one of low candlepower.

Kebler's paper is as follows:

"In determining the necessary qualifications for a dynamo lighting system for any particular use, the following points immediately become of importance.

"(1) The lamps to be used.

"(2) The dynamo output needed.

"(3) The dynamo speed and the method of driving the dynamo.

"(4) The proper size storage battery to be used with the dynamo selected.

"(5) The type of wiring.

"The most important of these is the first, that is, 'What lamps to use.' There are only three size bulbs now in general use for headlight work, these being, respectively, 16, 21 and 25 candle power. For small motor cars which travel at comparatively slow speed, and where the owners would be satisfied with light that, while better than acetylene lights usually supplied with these small cars, is still not the most powerful, and where he will not be liable to compare his lights with those of friends who have higher power to the detriment of the 16 candle power lamps, 16 candle power is undoubtedly ample. On the higher powered cars the 21 candle power bulbs are almost in universal use today. These will give ample light for driving up to a speed of say 40 miles an hour at night, illuminating the road far enough ahead so that any object may be observed in time to stop almost as well as in the day light, and in fact gives all the light that is needed. Such lamps, when used with a shallow parabolic reflector, will light a road 50 feet wide for the full width of the road from the front of the car to a point over a quarter mile away. A deep parabola of the same focus will light the road even further, but will not give as much light at the sides, close to the car.

"Where extremely high-powered cars are used, running at very high speed, and where very large reflectors can be used, 25 candle power bulbs are sometimes used.

"It must be realized that with small reflectors, built to take a 16 candle power bulb, the insertion of a 21 candle power bulb will not give the proportionate larger amount of light on the road that 21 is to 16, and similarly a 25 candle power bulb in a reflector built for 21 candle power will not give sufficient additional light to warrant its use.

"With a commercial reflector having the greatest diameter of 8 inches, a 16 candle power bulb is about all that can be economically focused. With one of 10 inches diameter a 21 candle power bulb should be used, and there is little use in using a bulb larger than 21 candle power unless you have a 12-inch reflector, which is very seldom seen, on account of the large size.

"The side lamps and rear lamps are signal lamps only, and for these bulbs of small candle power can be used. Four candle power or two candle power bulbs are adequate, and it is customary to use a 4 candle power side lights, and 2 candle power rear lights. The amount of current taken by these side and rear lights is so small that there is no objection to using 4 candle power bulbs for all three, or 2 candle power for all three, but the desirability to have a brilliant light at the side, for appearance, has led to the use of 4 candle power bulbs. Frosting these bulbs in the side lights gives a very pleasing appearance, and I think will be very largely adopted in the near future. In order to make sure that we have ample overload capacity to take care of the many short loads made by the horn, speedometer light, etc., the dynamo should be capable of delivering to the storage battery slightly more amperes than is required by the lamp load. For this reason an ampere output of 10 amperes of the dynamo has been almost universally accepted as the proper amount when such a lighting equipment is used. This will keep the storage battery always up to the best efficiency, and at the same time it is small enough, so that the storage battery will not have to have too large plates in order to run without undue deterioration.

"The dynamo should be so geared to the car as to give its full output at from 15 to 18 miles an hour and any speed above this.

"At a speed lower than 15 or 18 miles an hour, the car will not be driven for more than a very few miles with all the lights lighted, and the reserve capacity of the storage battery will more than make up for this short time. Of course, when the car is being driven in the city, where the headlights are not being used, it often runs slower than this speed, but at these lower speeds the dynamo is generating a proportionately smaller amount and will give ample current to take care of the two sides and the rear lamp, which takes only a total of about 2.3 amperes.

"A shunt-wound dynamo which will deliver 10 amperes at say 15 miles an hour, will deliver 2.3 amperes at 8 or 9 miles an hour, so that whenever the car is running it will supply ample current for the side and rear lamps.

"In dynamos of any one type, the size, weight and cost is determined by the ampere capacity and the speed at which this number of amperes can be put into a 3-cell lead battery.

"The cost of a dynamo which will deliver say 6 volts and 10 amperes at 1,500 revolutions per minute is 30 per cent. less than one which gives the same output at 1,000 revolutions per minute, and it is less than half the cost, and of about half the weight of one designed for the same output at 500 revolutions per minute.

"A shunt-wound dynamo designed to put 10 amperes into a 3-cell battery at about 1,000 revolutions, weighs approximately 21 pounds, and can be made approximately 8 inches long by 5⅝ inches high by 4¾ inches wide. If we reduce this speed to 500 revolutions the weight becomes approximately 33 pounds and the dimensions approximately 9¼ by 7½ by 4¾ inches.

"This 1,000-revolution dynamo should be run at about twice engine speed for the best results, and the 500-revolution dynamo should be run at engine speed for the best results. The question immediately comes up as a matter of judgment, whether there is sufficient advantage in running at the slower speed, to make up for the added weight and the added cost.

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"It will be found in general that where a shaft is provided on the engine to which the dynamo can be coupled, and this shaft runs at engine speed, the added weight and cost of the engine speed dynamo is warranted, because it eliminates the cost and complication of sprockets and chain for driving the dynamo. But where such a shaft would have to be put specially in the engine, and driven by gears, or when some shaft already projecting runs at engine speed, but is not so located that the dynamo could be directly coupled to it, and consequently either gears or sprockets and chain have to be used, there is little question but that a dynamo delivering its full output at 1,000 revolutions per minute and running at about twice engine speed, is the happy mean in the weight, cost and size. A dynamo which will put 10 amperes into a 3-cell battery at 1,000 revolutions, driven at twice engine speed on a car with 36-inch wheels, geared 3½ to 1 on the back axle, will start to charge the battery at from 6 to 7 miles an hour, and will give enough current to supply all the lamps, that is, about 10 amperes, at 15 miles per hour.

"The same dynamo on a car geared 3 to 1 with 36-inch wheels, starts to charge the battery at 9 miles per hour, and will deliver enough current to take care of all the lamps at 18 miles per hour. Such a dynamo I believe to be the ideal one, where there is no provision made for driving directly at engine speed.

"A machine running at higher speed than this has not sufficient advantage in less weight, and cost, to warrant the higher speed of the chain and the higher speed in revolutions per minute of the armature, and to warrant the additional wear on the bearings, and additional chance for noise. At the same time the use of a dynamo at less than twice engine speed to get a reduction in chain speed and wear on the bearings, has not sufficient advantage to warrant the use of a larger, heavier dynamo, running at say engine speed and driven by chain, or gears.

"On a dynamo driven by ⅜-inch pitch silent chain at twice engine speed, sprockets of 30 and 15 teeth would be used. At 45 miles per hour this chain would run at 1,500 lineal feet per minute and at 60 miles per hour at 2,000 feet per minute. This is not an execessive speed, but if a dynamo giving its output at 1,500 revolutions per minute were used running at three times engine speed, we would use 45 and 15-tooth sprockets and the chain speed becomes 2,250 feet per minute at 45 miles per hour and 3,000 at 60 miles per hour, which is too high for efficiency or long life. We may, therefore, decide not to run our dynamo at over two times engine speed.

"On the other hand, where it is possible to drive at engine speed through an Oldham coupling, the ideal case is undoubtedly reached, and in this case the additional weight and cost of the dynamo is warranted, as we save the additional cost of sprockets and chain and eliminate the necessity of oiling these, etc.

"A very useful method of driving the dynamo is to extend the pump shaft through the pump, leaving an extension to be directly coupled by means of an Oldham coupling.

"In other cases it is possible to have the armature shaft of the dynamo extend through both ends and drive from the timing gears through the dynamo armature to the magneto, having the magneto and the dynamo lined up in tandem. In each of these cases a dynamo running at engine speed is used for the 4-cylinder car, and 1½ times engine speed for a 6-cylinder machine.

"When neither of these methods is possible, and it becomes necessary to drive the dynamo by gears or silent chain, we will then use the higher speed machine, running at about twice engine speed, and this can be driven in a number of different ways.

"Where the pump is driven separately from the magneto, it may be driven at twice engine sped and the dynamo can be run directly from the pump shaft through an Oldham coupling.

"Where a shaft running at twice engine speed can be installed projecting from the timing gear case ,or from the gear box, it can be driven by gears or chain running in oil, and then the dynamo can be directly coupled to the shaft. This gives a noiseless and almost wearless drive.

"A sprocket on the pump shaft or magneto shaft driving a sprocket on the dynamo by silent chain at twice engine speed, is quiet, efficient and satisfactory. It is, of course, better if the chain can be enclosed and run in oil.

"Having determined all the necessary features of the dynamo regarding its output, speed and method of drive, we turn to the storage battery. The first thing to determine is the proper size storage battery to use with the dynamo selected. A proper storage battery must fulfil two conditions. (a) If the car owner runs entirely in the day time the battery must have sufficient square inches of plate surface to be charged whenever the engine is running at the maximum dynamo amperes without injury to the battery. (b) If the car is standing still with all lights lighted, the battery capacity should be sufficient to keep all the lights burning for 6 hours, and when only the side and rear lights are on, it should be capable of keeping these lighted for say two nights, or 24 hours.

"Considering 'A,' experiment shows that a battery having 160 square inches of positive plate surface and 200 square inches of negative surface, will not be injured by use with a dynamo giving 10 amperes output on an engine. Such a battery would undoubtedly be ruined if 10 amperes were put into it continually on the test bench, but the conditions in motor car service are so different as to require some comment.

"There are two things that cause rapid deterioration of storage batteries when they are charged continuously at high rate. The first is that the heating of the battery due to continuous charging, softens the plates so they become readily disintegrated. The second is that large bubbles of gas form on the negative plates, and when these bubbles break away from the plates, they take particles of the active material, especially when this has become softened, due to heating.

"On motor car work, in the first place, it is very seldom that a battery is charged continuously at the maximum rate for more than two hours at a time. There are always stretches of a few minutes when the engine is slowed down, so that the dynamo does not deliver its full output, or when the engine is stopped entirely, and the battery has a chance to cool off. As a result the service is not at all analogous to tests made on a test bench where the current is put into the battery continuously. On a test bench the battery would get hot, but on a car it will not.

"In fact in a battery with the plate surface already decided, there is little or no heating in ordinary service, and no excessive heating in the most severe service.

"In the second place the large air bubbles do not have a chance to form on motor car batteries, due to the jarring and jolting that a motor car gets in going over the road. Before the bubbles have time to become large enough for them to take off a serious amount of active material when they break away, they are jolted loose and do not injure the plates to any material degree. As a result it will be found that storage batteries can be run at almost double the charging rate without undue deterioration on a motor car, than they can when standing still on a bench.

"The mechanical agitator now often used for large stationary batteries to keep bubbles from forming, is replaced by the jolting of a motor car, and the various methods of cooling often adopted for large stationary plants, is taken care of in this case by the occasional slowing down of the engine and occasional stopping of the engine.

"A battery on a motor car is run under ideal conditions, because it is being constantly charged and discharged under ideal conditions as regards agitation and coolness. A battery having the plate surface mentioned above will light all the lamps, that is, discharge at a 9½ to 10 ampere rate for about 3¼ hours, and will light the side and rear lamps for 24 hours. Such a battery does not light all the lamps long enough, so that if batteries of this size are used there should be two of them, or a larger capacity battery, having at least 80 ampere hour capacity at a 10 hour rate, can be used. Any battery made by a reputable maker and having 80 ampere hour capacity at a 10 hour discharge rate, will fulfil all requirements. This latter battery will fulfil all the specifications and has ample plate surface, ample capacity to run all lamps for at least 6 hours, and the side and rear lamps for 24 hours."

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CHEMISTRY AND HEAT TREATMENT FOR MOTOR CARS

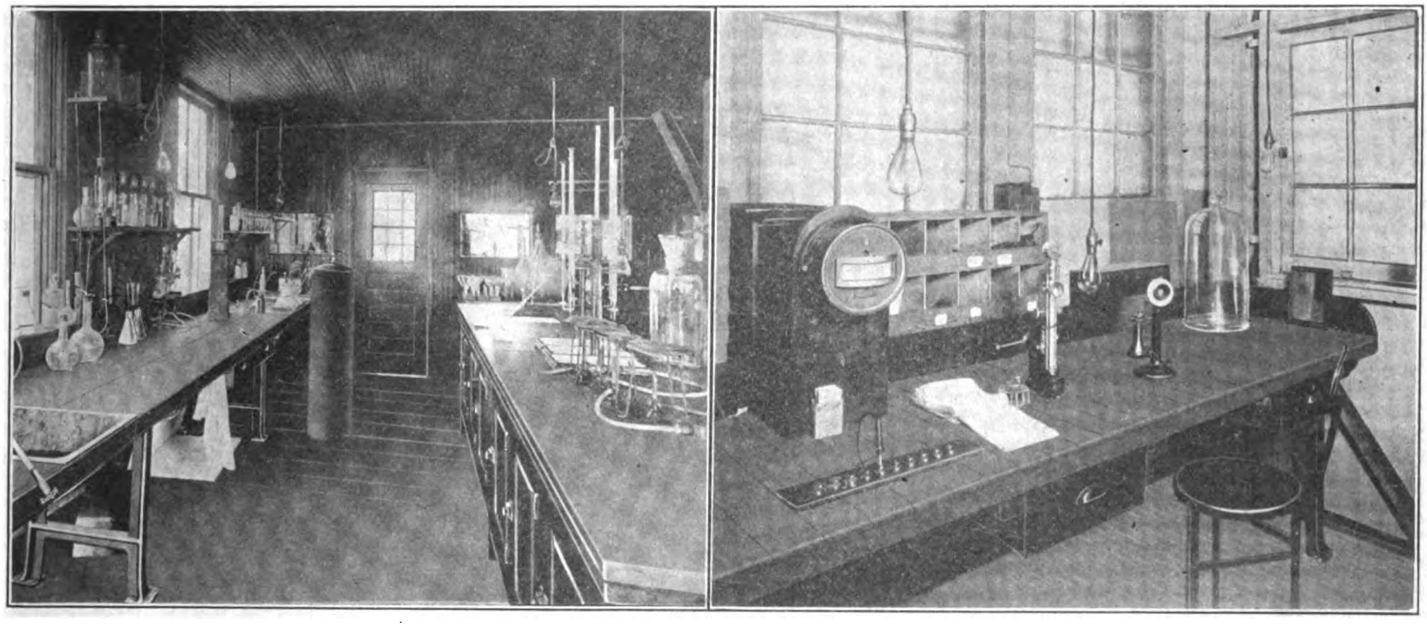
Manufacturing Processes That Have Been Improved and Results, Once Problematic, Made Certain by Scientific Manufacturing Methods—Centralized Control of Scattered Apparatus—Ingenious Testing Apparatus for Ascertaining Results of Various Processes.

Among the various processes that are carried out in the transforamtion of raw material into finished motor cars, there is none more shrouded in mystery than the heat treatment of steel, a process by which the very highest qualities of steel are brought out, and one which requires the utmost care for its successful termination. While the term heat treatment in its broader sense may be taken to include the familiar and ancient process of hardening and tempering tool steels, in its commonly accepted meaning it includes only the more recently developed methods of treating steels which are alloys of iron and small quantities of various other substances, such as nickel, vanadium, chromium, titanium and tungsten. Heat treatment consists, as the term indicates, of heating the steel in special and carefully regulated furnaces, the heating being followed by a cooling process which is controlled no less carefully than the heating, being in some cases very slow and in other cases rapid, as when the hot metal is "quenched" or immersed in a bath of water, oil or other liquid.

In heat treatment the whole process is governed by the characteristic behavior of the different components of the alloys under the influence of heat. Until quite recently it has been a matter of the utmost difficulty to obtain anything like uniform results from heat treatment of a number of pieces, or, for that matter, to obtain results approximating those sought for in one or two. There are very good reasons for this. The degree of heat required to bring about the best results differs not only with the substance with which the iron is alloyed, but with the proportions of the components; a little too much heat, or not quite enough, or a rapid cooling instead of a slow one, or vice versa, any one of these things may make the heat treatment of no avail, and the steel may be left in worse condition than before the treatment was attempted.

Controlling the alloys in the first place, and accurately regulating the heat in the second place, as well as learning just how the various mixtures were affected by different treatments have taken years of the hardest kind of work and study. Now, however, the chemical properties of the various substances are quite thoroughly understood, metallurgists are familiar with their behavior under heat and, last but by no means least, methods of heating and of indicating and controlling heat have been so vastly improved that large quantities of steel can be treated with certainty as to results. The furnaces used for the heating processes are fired with gas—natural or manufactured, according to the local conditions—or with oil, sprayed and mixed with air. The use of such fuels makes it possible to regulate the heat to a nicety by the mere manipulating of valves, and to maintain the desired heat for any required length of time. In furnaces burning coal or other solid fuel any such regulation as that required for the heat treatment of steel would be manifestly impossible.

Check is kept on the temperature inside the furnace by means of a pyrometer, which is in effect a thermometer built for extremely high temperatures. It differs from the ordinary thermometer, however, very widely. Instead of depending upon the expansion of a liquid under heat the unequal expansion of two dissimilar metals is turned to account, and in one type advantage is taken of the fact that an electric current is generated when two dissimilar metals are heated while in contact with each other. Electrical connection is made from the "couple," which is located within the furnace, to a very sensitive volt-meter, each side of the meter being wired to one member of the couple. Instead of being graduated in volts or fractions of volts, however, the meter is graduated to read in degrees. The hotter the couple becomes the more current is generated and the meter needle indicates accordingly. One of the great advantages of this system is that the temperature can be watched at any reasonable distance from the furnace, it being necessary only to carry the connecting wires to the meter. A whole battery of furnaces can be checked up from a single point



GENERAL VIEW OF HYATT LABORATORY

CORNER OF HEAT CONTROL STATION

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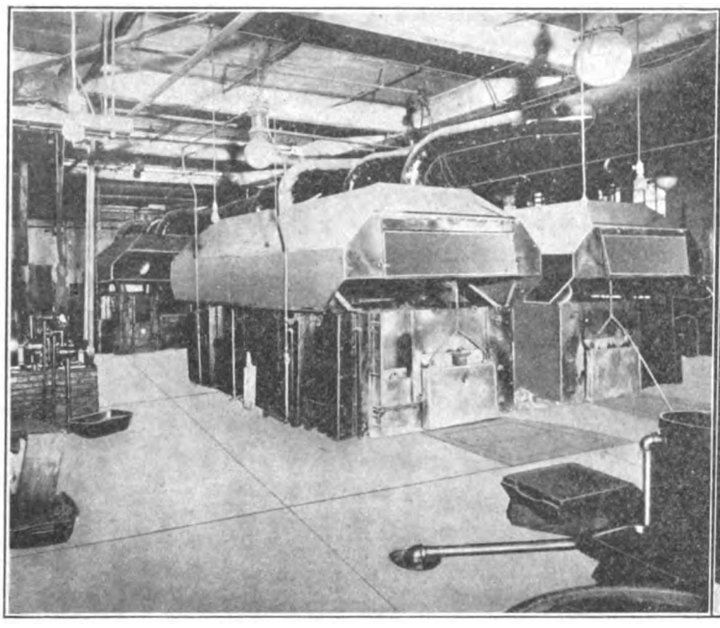
by installing one meter and a switchboard through which any furnace can be "plugged in" on the meter. The steadiness of the heat in a gas or oil furnace makes it unnecessary to do more than take occasional readings, so that this arrangement is all that is necessary. A furnace of this type also permits the simultaneous heating of a large number of pieces to the same temperature, so that in a manufacturing plant where production is in quantity this process is invaluable.

While extreme hardness of steel is not always the object sought in heat treatment, it is the object in some cases, and in all cases the various degrees of hardness of steel are indications or accompaniments of other conditions. For instance, a steel that is extremely hard will be extremely brittle, while one that is of extreme softness will bend very easily. Between these extremes will be found conditions which may be said to be the result of compromises. Spring steel, for instance, is so hard as to resist bending to the extent that it will not take a permanent "set" or change of form when bent, but will return to its original shape if the bending effort has not been carried beyond the elastic limit of the material. If the steel is too hard it will not bend sufficiently without breaking; and on the other hand, if it is too soft it will take a permanent "set" because it is deficient in the springy quality that comes from hardness. There is a certain degree of hardness that is the best for a given purpose, and while in a given instance it might perhaps be desirable to have the metal slightly harder, it might be that more hardness would result in brittleness, so that a compromise is necessary. But here is where the different characteristics of different alloys find much of their value. A steel that might be quite stiff enough for a certain duty when brought to a certain degree of hardness might be just brittle enough to snap under an execessive stress, while another alloy might attain the same degree of stiffness while remaining considerably softer, so that in case of abnormal loads or shocks it would merely bend, permitting the re-shaping of the part.

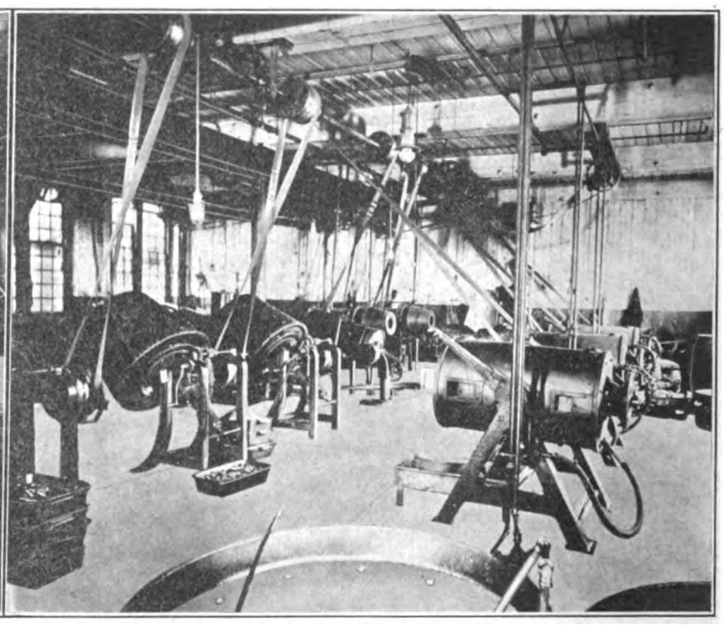
In order to determine the physical characteristics of various steels all kinds of tests are made with instruments and machines that differ according to the tests they are required to make.

Tensile strength is accertained by a machine which grips both ends of a bar and by main force pulls it in two, the number of pounds required to do this being indicated at the same time. Resistance to vibration and bending stresses is shown by a machine which holds a bar of steel fixed at one end while the other end is moved back and forth until the bar breaks, the indicator registering the number of vibrations or bends required to cause fracture. Transverse strength is ascertained by supporting a bar at both ends and applying pressure at the middle, the amount of pressure required to bend the bar or to break it, as the case may be, being registered. Resistance to compression is tested by crushing samples in a machine that crushes and at the same time indicates the pressure exerted. Other devices are used to test elasticity, ability to withstand short bends, torsional or twisting strains, shearing or cutting strains and so on. As might be imagined, the problem of accurately testing and indicating the degrees of hardness of steels required no little ingenuity to solve, but solved it was. Among the instruments most used for this purpose—which are called scleroscopes—one is arranged to press a steel ball of extreme hardness into the sample under test, the number of pounds required to force the ball to a given depth being the standard, or else the depth to which the ball can be sunk with a constant pressure. In the latter case the depth of the depression made by the ball is the standard, and is accurately measured by a special instrument with an indicating dial marked off with an arbitrary scale. Another type of scleroscope drops a steel ball on the surface of the sample and the distance of the rebound of the ball is the measure of hardness of the metal, the ball rebounding higher from a hard surface than from a soft one.

Physical tests are useful as indications of physical characteristics, but alone they do not furnish the data needed by the metallurgist in determining how he shall proceed in the matter of heat treatment, for this is a matter of chemistry. Therefore chemical analyses are made of samples taken from the stock and the treatment adopted is based on the results obtained in the chemical laboratory; the physical tests made of the material after treatment are compared with tests made before treatment, the difference in results indicating the efficacy of the processes. Such analyses and physical tests are of the greatest importance—in fact, it may be said that they are absolutely necessary—in manufacturing establishments where large quantities of steel parts are turned out, all parts of a kind requiring to be uniform in every respect. In the manufacture of roller bearings, for instance, it would be a fatal error to permit any variation in the hardness of the rollers, for it would mean that in service the wear would be unequal and the antifriction qualities of the bearings would be seriously impaired and their useful life shortened. Of the very large manufacturers of such bearings the Hyatt Roller Bearing Co. is conspicuous for its unusually thorough methods of dealing with the treatment of steel from the analytical lab-



HYATT'S HEAT TREATING FURNACE ROOM



BATTERY OF CASE-HARDENING OVENS

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oratory tests right through to the final gauging and inspecting of finished parts. It is fairly obvious that where vast numbers of parts are turned out anything that will ensure uniformity means economy in the long run, almost regardless of the cost of providing such safeguards. Therefore it is quite in the natural order of things that the Hyatt factory at Newark, N. J., should be equipped with the most approved apparatus. The accompanying illustrations serve to indicate the elaborateness of the installations and the clean, unencumbered appearance of the factory.

The first step, when raw material reaches the factory, is to make a chemical analysis of samples from each shipment received, the results being systematically recorded. A sufficient number of samples is analyzed to eliminate all doubt as to the uniformity of the quality of the steel throughout each shipment and to furnish a sound basis upon which to calculate the subsequent heat treatment. The machining process follows, in which the stock is formed, just sufficient surplus material being left to allow for the final finishing by grinding. The Hyatt bearings having flexible rollers formed of spirals of steel, it is particularly important that there should be in the material used the most effective combination of tensile strength and elasticity, together with sufficient surface hardness to resist wear. The desired results are obtained by using steel having particularly suitable qualities and heating it to a predetermined temperature, quenching it in a liquid, which results in great hardness, and finally re-heating, which considerably tempers the glass-like hardness and at the same time increases the toughness of the steel. To indicate the remarkable efficacy of heat treatment of steel a comparison of figures may be made, the three qualities mentioned being those particularly necessary in the rollers. The tensile strength of one particular sample before heat treatment was 116,300 pounds per square inch, that being the force required to tear apart a bar having a cross sectional area of one square inch. After treatment it needed 216,800 pounds, an increase of 100,500 pounds. The elastic limit was raised from 95,300 pounds to 196,000 pounds, more than doubling the figures. Before hardening the scleroscope scale indicated 41, and after hardening. 60. The rollers are of uniform temper throughout.

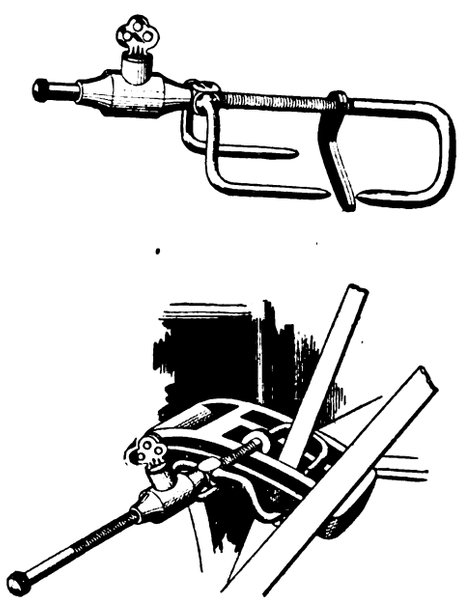
For the races which form the inner and outer surfaces upon which the rollers travel a different material is required and a different mode of treatment. Flexibility is not required—in fact, it is most undesirable—but a hard, wear-resisting working surface is essential. Therefore a process is adopted which is known as carbonizing, the races being packed with granulated bone and other substances in furnaces and subjected to a carefully regulated heat for a length of time which varies with the size of the parts and the depth of the hard "case" required. For example, a piece ⅛ of an inch thick and 1⅛ inches in diameter requires "soaking," as it is called, for nine hours in order to permit carbon to penetrate to a depth of 3/64 of an inch. This carbonized stratum is capable of being hardened, and is hardened, while the core remains comparatively soft and tough, the combination producing a race that is at once rigid and not liable to fracture.

All the furnaces used in these processes are equipped with Le Chatelier pyrometers, electrically connected with a central control station consisting of a switchboard and an indicating instrument, as shown in the illustration. Each furnace is cut into the indicator circuit at stated periods and the reading recorded and, if necessary, the gas or oil feeds adjusted to keep the temperature within the prescribed limits. Samples from each "heat" are fractured and examined by the metallurgist in charge through a microscope and tested as to physical qualities in an Olsen testing machine. Incidentally, races are required to be considerably harder on their working surfaces than the rolls, testing to 80 on the scleroscope, as against 60 for the rolls.

While what has been said gives an idea of the elaborateness required for the proper handling of steels in a large manufacturing establishment, it can convey no idea of the enormous amount of scientific research and experiment that has gone before. The production of each particular variety of steel has been a study in itself; so have the evolution of the heating apparatus, the development of the testing instruments and the working out of the various hardening and carbonizing formulae. Behind all this there are the years spent by the metallurgical chemists and the heads of various departments in acquiring the highly specialized knowledge required for their work. It is not difficult to understand, therefore, that any industry which is devoted to the production of steel products of a high quality is not the result of a mushroom growth, but rather is the culmination of years of hard work in many branches of science.

Moon Devises a Gear Lever Lock.

While devices designed to prevent the unauthorized use of motor cars are legion and the means of making them effective are as numerous as are the places on a car where they can be applied, there can be no gainsaying that a device which, when properly applied, absolutely prevents the shifting of the gear lever from neutral position can be relied upon to frustrate any attempt to operate the car. Such an attachment is the Moon auto lock, which just recently has been placed on the market by the Moon Specialty Sales Co., of 1223 South Olive street, San Francisco. The accompanying illustrations, which show the Moon lock separately and attached to the quadrant, reveal both the construction and the method of application quite clearly. The lock is claimed to be proof against filing, sawing and picking; two keys are furnished with each lock and no two locks can be opened with the same key. While the lock prevents the operation of the car because it makes the meshing of the gears impossible, it does not interfere in the least with the moving of the car by hand.



MOON LEVER LOCK

Dow Develops a Tire For Trucks.

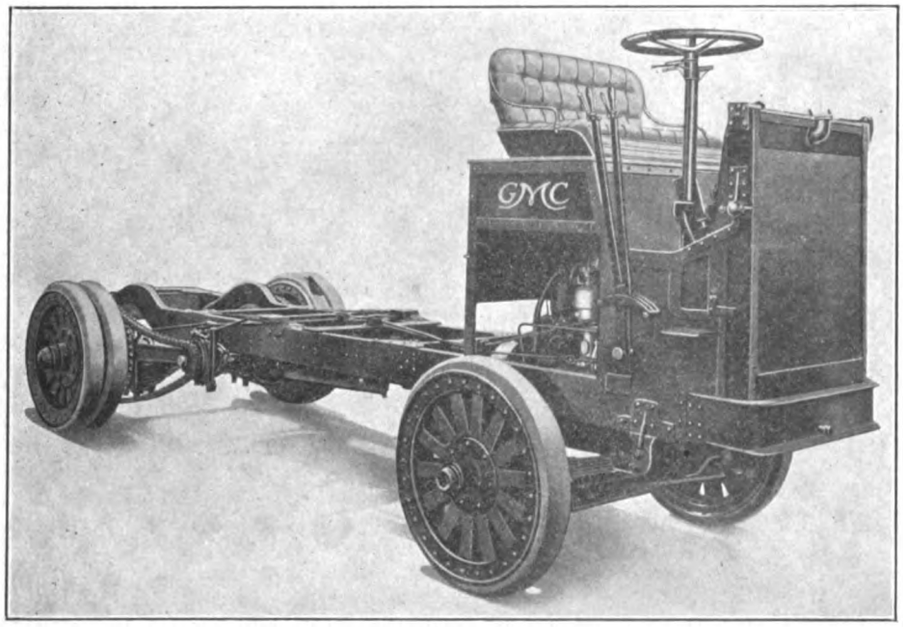
Alexander Dow, of New York, who is fairly well known to the trade by reason of his connections as a consulting engineer, and also because of the rim and non-puncturable inner tube which bore his name, has made still another incursion into the realm of vehicle tires, his latest invention bearing the United States patent number 1,024,189 and the date of the 23d ult. It is a solid commercial vehicle tire that has claimed the attention of the inventor this time, however, and its construction is such as to give real promise of its possibilities. Already one well-known tire manufacturer who shortly will embark in the manufacture of the usual types of solid rubber tires has evidenced sufficient interest in the new Dow tire to go to the expense of getting out molds and manufacturing some of the tires for testing purposes with a view to producing it on a royalty basis. Incidentally, some of the tires which are to be produced in the near future will be shipped abroad to be tested by the British Dunlop company on some of the buses of the London General Omnibus Co. The object sought in the new tire is to reduce cutting and chipping away of portions of the rubber and to this end several layers of fabric are inserted in the body of the tire. In order to permit compression and a certain elongation of the rubber without fracturing the cotton fabric, however, the latter is inserted in diagonal and undulating sections in such a way that distortion in any or all of the three directions may take place without serious consequences.

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BODY THAT FACILITATES LOADING

General Motors' New Design Brings Truck Platform Close to Ground—"Kick-up" Over Axle a Feature.

That the economical operation of motor trucks depends to a great extent on loading and unloading facilities is a matter of fairly common knowledge. Economy of operation depends on system and just as surely as system reduces maintenance cost by eliminating waiting time, which must be charged against the investment represented by the vehicle, so will the efficiency of the service appreciate. Consequently in the majority of cases where several trucks are operated under the same ownership considerable attention is devoted to providing suitable loading platforms to reduce the idle time of the trucks to the minimum. But whereas such methods take into consideration one end of the haul, little attention is paid to the other end, where, as a rule, the driver (and his helper if he has one) is left to his own devices, which necessarily are limited in compaarison to the facilities at the home station, to unload his vehicle. As a result, the time that may be saved at one end often is more than offset by the time that is lost at the other end.



NEW 5-TON G. M. C. CHASSIS WITH UNDERSLUNG SPRINGS

It is in appreciation of these facts that the General Motors Truck Co., Detroit, Mich., has added to its already extensive line of commercial vehicles a new type of chassis which is calculated to reduce operating costs by facilitating loading and unloading at both ends of the haul. To attain this desirable result, the manufacturers have had recourse to the simple expedient of attaching the rear springs to the under side of the axle. Though the idea expressed in the construction is not absolutely new, it has been carried a little further than is usual by forming the side members of the frame with a decided "kick up" over the axle and in this way the total distance between the road surface and the loading platform has been reduced to the point where it is just sufficient to permit of ample road clearance.

The construction of the new chassis makes them particularly suitable for use where loading platforms are not provided, as on docks, for instance, and where frequent discharges of freight at the road or street side are necessary, as less time is required and the operation of shifting the load from the comparatively low platform is less burdensome than would be the case with the ordinary truck. The actual measurement between the loading platform and the road surface, with the truck loaded to capacity, is but 24 inches; it is slightly more when the truck is light, of course, though in any case the height is considerably less than it is with ordinary construction.

The new chassis is made in two sizes, namely, 3½ and 5 tons capacity, and except for the shape of the frames and the underhung spring suspension does not differ materially in mechanical construction from the standard G. M. C. models of the same capacities. The wheelbase of both models is 138 inches and the chassis prices are $3,700 and $4,700, respectively.

Less Than 6,000 Automobiles in Spain.

According to the last official returns, there were but 5,500 motor cars registered in all of Spain, of which number 1,950 had been registered during the year 1911, indicating that the advance of the automobile is not particularly rapid in that country. During the year 1911, however, the imports of automobiles jumped from $2,225,000 to $3,425,000.

YELLOW AS A CATCH-FARE COLOR

Legal Proceedings Uncover Trick of the Taxicab Trade—Big Company Forces Small Operator to Repaint Cabs.

Due to an action instituted last week by the Yellow Taxicab Co., of New York City, against Alfred Biancheri, light was thrown on one of the many unsuspected tricks of the taxicab trade. As its title suggests, the Yellow Taxicab Co. operates cabs of which yellow is the distinguishing hue. There are so many of them that Biancheri, who owns but two cabs, adopted yellow as his color and, according to the allegations in the case, he was but one of a number of small operators who did the same thing in an effort to attract business from the big company.

According to the complaint, so much confusion resulted from the similarity of colors that many patrons of the Yellow Taxicab Co. took other yellow cabs by mistake and were embarrassed when they found that their account cards were of no service.

The particular color claimed by the Yellow Taxicab Co. is described in papers as Bristol orange. It is claimed that it has become a trade asset and whether or no any cab owner has a monopoly of a particular color, Judge Erlanger, in the New York Supreme Court, granted an injunction restraining Biancheri from "maintaining, constructing, decorating, painting or offering for private or public hire taxicabs so designed, constructed, painted or decorated in imitation of the plaintiff's yellow taxicabs, or so closely designed or decorated as to be intended to defraud and lead the public and patrons of the plaintiff to patronize and hire the taxicabs of the defendant with the belief that the same are taxicabs of the plaintiff."

It is likely that similar proceedings will be instituted against several other offenders.

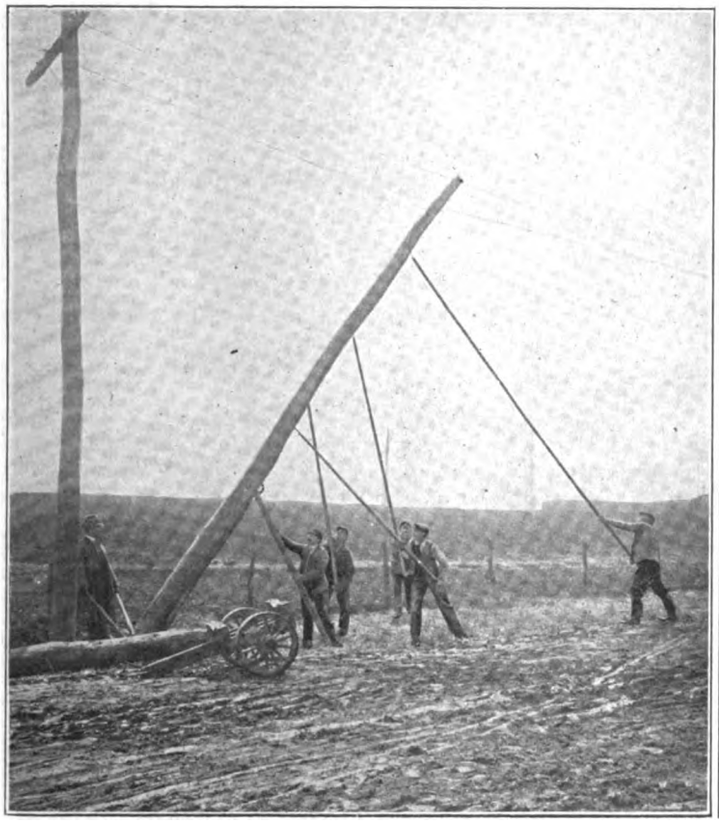
To Give Medals for Maxwell Miles.

In order to stimulate the interest of Maxwell owners and, incidentally, to keep a line on the performances of their cars, the Maxwell-Briscoe Motor Co. has undertaken the promotion of what will be styled the 50,000-mile Maxwell Motor Club, which will provide gold medals for all Maxwell owners who have completed, or may complete, 50,000 miles. Silver medals also will be awarded to those who reach the 25,000-mile point. It is not essential, however, that the entire distance be covered in one Maxwell car. Berry Rockwell, who is attached to the publicity department of the United States Motor Co., of New York, of which the Maxwell-Briscoe company is a part, has been designated secretary of the 50,000-mile club and will have immediate charge of the compilation of the mileage records and of the distribution of the medals.

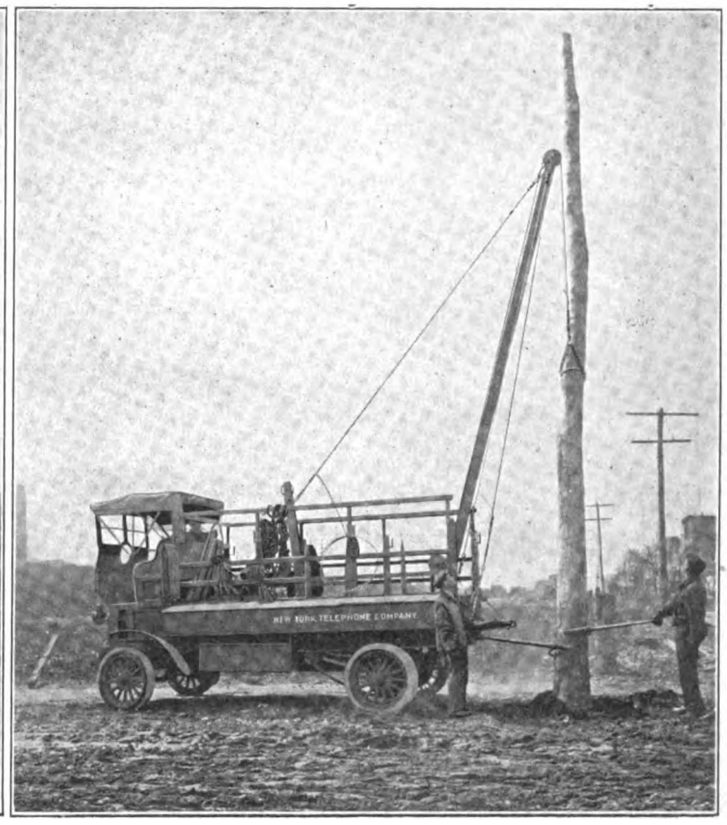
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MOTOR TRUCKS' BIG PART IN TELEPHONE SERVICE

What They Have Done to Facilitate Operations of One Prominent Company and How 48 of Them Save $72,000 a Year—Their Practicability Amply Demonstrated But Horses Not Wholly Displaced—Interesting Facts and Figures Born of Eleven Years' Experience.



OLD WAY OF ERECTING TELEPHONE POLES



MODERN WAY OF PERFORMING SAME WORK

It may seem inconceivable to the average man in the street that the replacement of horse-drawn vehicles with 48 motor trucks, 43 of them being gasolene, of which 10 are of 800 pounds capacity, and the other 5 are electric, could be directly responsible for a net annual saving in operating expense of $72,000. And yet, startling as the figure may seem, this enormous saving has been effected and still is being effected by the New York Telephone Co.—in fact and not in fancy.

System and organization are the backbone of every business of magnitude and it is doubtful if any business is run under more economical conditions than that of the truly immense New York Telephone Co.; it exhibits a nicety of adjustment and a smoothness of operation that can only be obtained with the aid of the oil of real efficiency. It requires that the latest and most up-to-date methods and machinery be employed—any paying business does, for that matter—and after all it may not be so surprising that operating costs have been so materially reduced during the past few years with the help of motor trucks.

But just as has been found in hundreds of other cases, so it has been found in the case of the New York Telephone Co.: The motor truck may not be used indiscriminately if ultimate efficiency is to be advanced. It has its sphere of usefulness and it gradually is being increased in size. But it cannot hope to compete with horse-drawn vehicles in economy of operation under certain conditions. In some cases the motor truck has completely ousted the horsed vehicle, but in other cases it has not and it is doubtful if it will for quite a long time to come.

Consequently, despite the enormous saving of some $72,000 which is effected with the help of 48 motor trucks—there still remain 5 more trucks, 14 touring cars and 97 runabouts to be accounted for, and though the total saving is not divulged it would seem $72,000 is a modest figure—the company continues to make annual outlay of some $385,000 for the hire of horsed vehicles; they are used where the employment of motor trucks would cause a deficit instead of a saving.

Such are the facts and figures as compiled by A. W. Allen, who is the superintendent of buildings and supplies for the New York Telephone Co., and they cover a period of 11 years. He tells, in the Telephone Review, which is the house organ of the company, of the first experiments which were made with motor trucks and the experience of the company from 1901 up to date, and it is seldom that a more interesting statement of operating experience makes its appearance.

"Back in 1901, when the New York Telephone Co.'s field of operation comprised Manhattan, The Bronx and Westchester, the construction department put in service the first motor vehicle owned by the company," says Allen. "This was an electric, manufactured by the Vehicle Equipment Co., of 10,000 pounds capacity, equipped with two 1¼ horsepower motors for propelling the truck, taking current from a lead battery and another motor of two horsepower taking current from the same battery for operating a 'nigger head' used for pulling cable into the subway. This was before the time of extensive aerial cable construction work, so that in the design of the pulling

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device, only the conditions met with in underground work had to be considered. This truck remained in service until 1907.

"From 1905 to 1909, three more electrics were purchased; two of 2,000 pounds capacity and one of 3,000 pounds capacity. These were of the Lansden make, equipped with Edison batteries. All three of these trucks are still in the delivery service of the repair shop.

"In 1907, the construction department in New York put in service the first gas truck owned by the company. This was a Hewitt of 10,000 pounds capacity and equipped with a Higbie hoisting winch geared to the truck engine. This truck has a splendid record and is still in service.

"The developments and economies resulting from the use of the Hewitt truck in Manhattan, The Bronx and Westchester, in both underground and aerial cable work, created a demand for motor trucks throughout the company's territory which at this time included the old New York company operating in Manhattan, The Bronx and Westchester, and part of Connecticut, and the merged companies operating throughout the remainder of the State of New York, and a part of the State of New Jersey. This demand was due largely to changes in outside construction methods involving a more general use of aerial cable. The amount of this work under way and contemplated, made it apparent that a limited number of trucks equipped with power winches could be kept continually busy for a number of years. In the fall of 1910, a careful study was made to determine the number of motor trucks required in each plant division, considering only their installation where continual use and a saving in man labor would insure greatest economy. This study led us into a consideration of motor vehicles, not only for cable construction, but for all other lines of telephone development and maintenance work.

"The transportation problem of the Telephone company is made up of a number of fairly distinct elements:

"a: The transporting of heavy construction material.

"b: The use of a truck equipped with a power winch as a tool in erecting poles and placing lead covered cable in the plant.

"c: The transporting of loop gangs with their tools and equipments.

"d: The delivery of splicers' supplies.

"e: The delivery of subscribers' station apparatus.

"f: The distribution of repaired material from the shop.

"Over a period of several months, records were maintained of loads carried by horse-drawn trucks both in underground and aerial cable work (classes a and b). These records showed that the average load was about 5,000 pounds, although in a number of cases 8,000 pounds were carried, and in other cases, two trips of a horse-drawn truck were necessary where one trip of a large capacity motor truck would have proven more economical. These cases however, were infrequent enough to show that on the average a truck to meet the maximum condition would go out loaded to about half of its capacity, and the cost of maintenance, as against a truck which would more nearly meet the average condition, was so much higher as to entirely offset this saving in carrying the occasional heavy load. We, therefore, decided that a truck of 6,000 pounds capacity would best meet our requirements, and that it must be equipped with a power winch and a strongly built body of special design.

"In the study of loop work (classes c, d and e) the requirements were radically different from those met with in a consideration of construction work. The trucks would be used in the delivery of subscribers' equipment and splicers' supplies, and in the transportation of loop gangs with their tools and equipment. No winch was required in this service, and the economy in transporting heavy loads was offset by the larger economy to be obtained through the greater speed of a truck of small capacity. It was very much more difficult to determine the proper carrying capacity for this service, because in suburban territory, the truck in addition to transporting the gang would be required to carry subscribers' equipment, wire, miscellaneous material and tools, the weights of the load varying with the outside plant facilities at point of installation and the number of installations to be made in one day.

"Again, in city work, where block and house cable facilities are provided in advance, the only material to be delivered by truck is subscribers' equipment and inside wire. The chauffeur operating the truck would be required to make the delivery. In this work the congested traffic conditions precluded the possibility of high mileage, and the nearness to the base of supplies made it unnnecessary to consider a truck of greater capacity than was required for one day's deliveries.

"In the delivery of splicers' supplies to the man on the job, the size of the truck to be used as between one of 2,000 pounds and 4,000 pounds is problematical depending largely on the number of men to be served, the radius of operation, the distance from the supply base and the weight of load for one day's deliveries.

"A final analysis of this service indicated that for classes c and d, a truck of 2,000 pounds capacity would meet the average condition and that for class e a truck of 800 pounds capacity should be used.

"It proved less difficult to determine the repair shop's requirements (class f) because the Lansden electrics had been in that service for a number of years and we knew what conditions were involved. When these electrics were put in service, the shop served only the storerooms and central offices in Manhattan, The Bronx and Westchester. With the merging of the New York and New Jersey Telephone Co., taking in Long Island and a part of the State of New Jersey, it was found more economical to close the shops which were maintained in Brooklyn and Newark and serve the entire territory from the shop in Manhattan.

"This wider field of operation necessarily changed entirely the method of shop deilveries. The Lansdens had proven very satisfactory in the congested sections of Manhattan, but their limited daily mileage and speed made it uneconomical to send them on the longer hauls into Long Island and New Jersey. Our study indicated that the operations of electrics should be con-

STATEMENT "A"

Comparison of Motor Vehicles With Horse-Drawn Vehicles

Detail of Operating Expense and Saving made by Three-Ton Trucks Used by Cable Placing Dept.

Annual Operating Expense, Three-Ton Mack Truck Based on Performance of 10 Trucks, Average 10,900 Miles		Approximate Gross Annual Saving on Horse-Drawn Vehicles Replaced by Three-Ton Mack Truck Based on 7 Months' Usage	
Chauffeur's Salary (full time including overtime)	$1,146.50	Truck hire (Aug. to Feb.)	$2,904.20
Garage and washing	240.00	Carfare (Aug. to Feb.)	361.69
Gasolene (.0365 per mile)	397.85	Freight (Aug. to Feb.)	118.00
Lubricants (.0171 per mile)	186.39		
Tires (.055 per mile)	599.50	Total 7 months	$3,383.89
Supplies (Miscellaneous)	54.50		
Repairs	240.00	Approximated annual saving	$5,800.00
Depreciation, interest and taxes	1,020.50	Approximated annual saving by placing cable	500.00
Total	$3,885.24	Total	$6,300.00

Approximated Gross Annual Saving by Three-Ton Mack Truck	$6,300.00
Annual Operating Expense of Three-Ton Mack Truck	3,885.24
Net Annual Saving per Truck	$2,414.76

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fined to the downtown sections of Manhattan and Brooklyn; that 2,000-pound gas trucks should be used for longer hauls where daily deliveries were required; and 4,000 to 6,000-pound gas trucks for the longer hauls where tri-weekly service would meet the plant requirements.

"After determining the requirements for all of the trucking conditions which we intended to consider at that time, we placed orders with the Mack company for:

17 trucks of 6,000 pounds capacity, equipped with power winches,
1 truck of 4,000 to 6,000 pounds capacity, and
15 trucks of 2,000 pounds capacity.

"Later an order was placed with the Ford company for 10 800-pound delivery wagons.

"All of the trucks other than the 6,000-pound type were to be of standard design. The 6,000-pound trucks were to be equipped with power winches and body of special design. These bodies were to be of two types, one arranged with locker compartments extending over the wheels outside of the loading space which was narrowed down to 5 feet; the other with all of the available space in the clear giving a loading platform 6 feet wide by 13 feet long. The winch specification required two speeds, one of from 20 to 40 feet per minute for loading and unloading heavy reels; and another from 40 feet to 175 feet per minute for pulling in underground and aerial cable. The construction of the winch mechanism must be such as to permit of reverse, in order that at the completion of a cable pull, while tension is still on the pulling line, the drum may be released to allow of the removal of the cable grip.

"The manufacturer met all of these conditions by taking advantage of the internal clutch type of sliding gear transmission. Another lever was provided in addition to those used for operating the truck, so that with the transmission in neutral, the operation of this lever would prevent the clutch from engaging the pinion driving through the bevel gears. The intermediate and low speeds and reverse of the transmission could then be applied to the winch through the transmission to a worm driven jack shaft under the winch, thence by chain drive to the winch drum.

"The use of the 6,000-pound winch truck is peculiar to the telephone business in that the actual trucking problem is complicated through the necessity of adapting the truck to hauling of supplies, and when destination is reached, the utilization on the job as a tool in the hands of the plant workmen. The power winch makes it comparatively easy to place a reel of cable 6½ feet in diameter and weighing 2½ tons, on the truck. When the reel is transported to the job, the winch is again used in pulling the cable into the subway or aerial rings. The first saving involved is one of labor in loading; the second, the greater speed of the power truck in getting to destination; and the third, a saving of labor in finally placing cable in the plant.

"A very interesting comparison may be drawn between the truck used continually in extensive aerial or underground construction work, and the truck assigned to a definite area within which it will be used for handling the construction jobs and the repairs and replacements incident to the upkeep of old plant.

"In the first case, we will take the actual records of the work done by a 6,000-pound winch truck in delivering and placing in the plant 35,391 feet 300-pr. No. 19-gauge and 600-pr. No. 22-gauge underground cable:

Delivery from freight station to job:
79 reels—total weight 153½ tons.
Number of miles traveled—190.
Cost of delivery per ton—$0.84.
Pulling into the subway:
Number of sections—95.
Average number of sections pulled per day—12.
Average number of feet pulled per day—4,464.
*Average winch cost per foot—$.00275.
Returning empty reels to freight station:
79 empty reels returned.
Number of miles traveled—90.
Average cost per reel—$0.93.

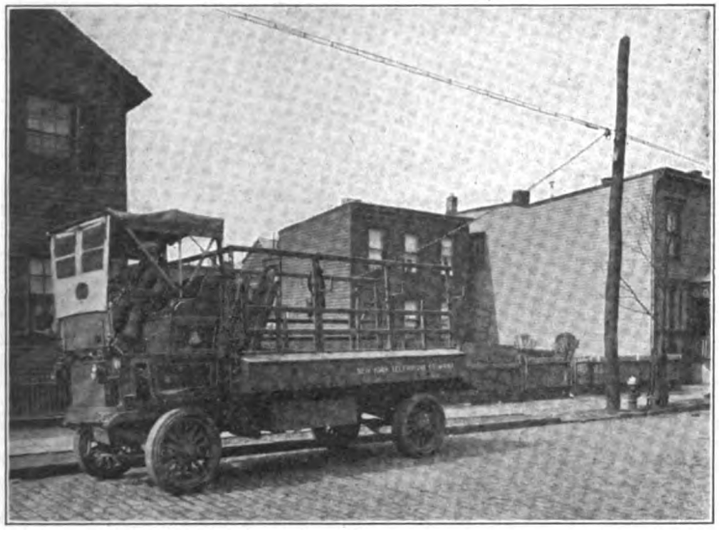
*This figure includes all fixed charges on the truck. To be more exact, we should eliminate depreciation on body and frame and tire charges, as the winch is used while the truck is standing idle.

"We have a number of trucks that are used continually in the service as outlined above. The average mileage of such trucks is approximately 11,000 miles per year; that is, the truck is used as a truck more than 50 per cent. of the time, and the saving involved is largely in the cost of trucking as compared to a horse-drawn truck. Statement 'A' gives the estimated yearly operating cost and saving based on actual records of seven months' use.

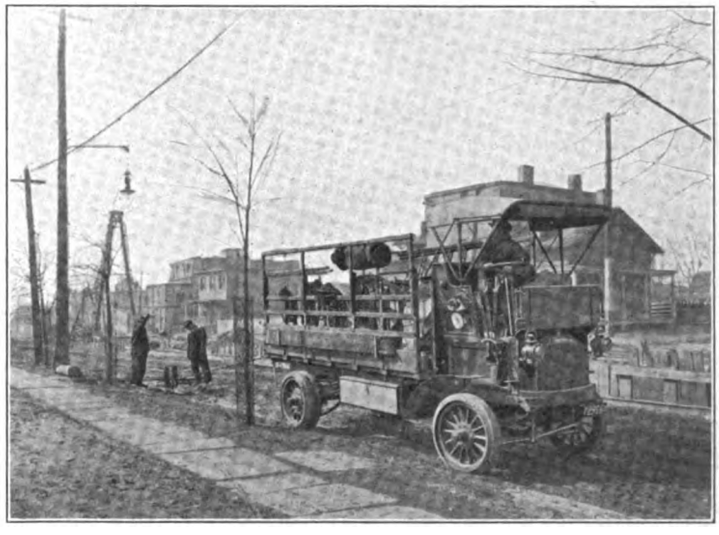
"In the second case cited, the truck covers approximately 5,300 miles per year, or to express it in different terms, in a working day of nine hours, it is traveling only 22 per cent. of the time. In the territory where such trucks are used, transportation facilities are relatively poor, so that there is a decided economy in having the gang report at headquarters where the truck is to be loaded in the morning, and ride with the truck to the job. Such trucks may cover anywhere from one to five jobs in a day, the men in every case traveling from job to job with the truck.

"The truck is utilized on the job pulling in cable, starting and setting poles, and necessarily stands idle more of the time than in the first case cited, as it acts more as a utility tool in the hands of the workmen, than as a truck.

"Statement 'B' estimates the total cost of operation for such a truck over a period of a year and the estimated saving based on actual daily records maintained over a period of about seven months.



HOW CABLE IS HAULED UNDERGROUND



METHOD OF HANGING OVERHEAD CABLES

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"In Statement 'A' depreciation is based on a 5-year life. In Statement 'B,' depreciation is conservatively based on an 8-year life. It is clear from a study of the statements, that because of the smaller mileage, it would be fair to assume that depreciation should be nearer 10 per cent per year than 12½ per cent. as is figured.

In the case first cited, it is very easy to determine whether or not the installation of a power truck will effect economies. In the second case cited, territorial and operating conditions must be studied more carefully; otherwise, a power truck which is apparently doing good work may be costing more than a horse-drawn truck.

"Studies made along these lines in a large percentage of the cases show that the use of the power truck proves more expensive than the use of the horse-drawn truck.

"One of the most interesting developments which have followed the use of the winch truck has been the installation of a lead sleeving or other supplies as may be required for carrying on the work. This service has effected a considerable saving over the horse wagon delivery.

"Statement 'C' shows the average operating cost of the 2,000-pound truck. The gross saving effected represents the actual amount of money expended for hired wagons and clerical labor prior to our purchase of power trucks.

"We are not prepared, at this time, to furnish detailed figures on the saving effected through the use of the 2,000-pound truck in aerial loop work. In fact, we have not in any case replaced horse trucks where the entire time of a power truck would be required. We are using eleven 2,000-pound power trucks, where part time is given to loop work and part time to the delivery of pole line hardware, wire and miscellaneous material, used in the aerial plant; in every instance these trucks have been installed where there was no doubt as to the saving to be effected. I might cite a case in the

STATEMENT "B"

Comparison of Motor Vehicles With Horse-Drawn Vehicles

Detail of Operating Expense and Saving made by Three-Ton Trucks Used by the Heavy Aerial Construction Gangs

Annual Operating Expense Three-Ton Mack Truck Based on Performance of 7 Trucks, Average 5,310 Miles.		Approximated Gross Annual Saving on Horse-Drawn Vehicles Replaced by Three-Ton Mack Truck	
*Chauffeur's Salary (part time)	$360.00	Teams for Hauling Men, Tools, etc	$1,450.00
Garage and Washing	240.00	Placing Cable	350.00
Gasolene (.0625 per mile)	331.87	Extra Truck for Hauling Poles	150.00
Lubricants (.0325 per mile)	172.57	Extra Truck for Hauling Cable	300.00
Tires (.055 per mile)	292.05	Traveling Time of Men	1,200.00
Supplies (Miscellaneous)	54.50	Labor Setting Poles	300.00
Repairs	120.00		
Depreciation, Interest and Taxes	750.00	Total for year	$3,750.00
Total	$2,320.99		

Approximated Gross Annual Saving by Three-Ton Mack Truck	$3,750.00
Annual Operating Expense of Three-Ton Mack Truck	2,320.99
Net Annual Saving per Truck	$1,429.01

*The Chauffeurs operating these trucks are experienced linemen and work with the gang when trucks are standing idle; hence part of their expense is properly chargeable to the work.

derrick for setting poles. Whereas the old method required from six to eight men, and a time element of from 10 to 20 minutes, per pole, the new method requires the services of only two men to hold the butt of the pole in position, while the chauffeur operates the winch in lifting the pole and dropping it into the hole; the time element in this case being from 2 to 5 minutes, or in other words, the cost of setting the pole is practically eliminated.

"A satisfactory hole digger to be used in conjunction with this pole derrick is one of the anticipated developments which will materially reduce the expense of building pole lines.

"In parts of our territory, where we have extensive underground plant, the 6,000-pound truck is used for delivering and pulling in underground cable. After this has been accomplished, the splicing forces are employed in connecting up section lengths and cutting cable into service. The 2,000-pound truck is used as a traveling storeroom, going from job to job, furnishing each splicer with tools, solder, paraffine, Long Island Division where two 2,000-pound trucks replaced four horse-drawn trucks in handling this combination work, effecting a net saving, in truck hire and labor combined, of $2,900.00 per year.

"Prior to the time when a satisfactory motor wagon could be secured at a reasonable cost, the most economical plan of handling subscribers' installations was to have the installer carry with him to the job the apparatus to be used. This necessitated the workman reporting at the storeroom each morning to get his equipment and returning there during the day as apparatus was required for other installations. It is quite apparent that, in handling installations in this manner, much time was lost by workmen in traveling from storeroom to the job and returning to the storeroom when additional material was needed during the day.

"By relieving the installer of carrying material, or by reducing the time required in this particular phase of the work, more of his time could be applied to the actual installation. This result had been partially accomplished in the past through having six retail storerooms on Manhattan Island —the installation forces operating by districts, with the nearest storeroom as district headquarters.

"In utilizing power wagons for delivering equipment directly to the subscriber's address, the first economy effected is through cutting down the installer's traveling time, as, instead of reporting to the storeroom in the morning, he reports directly to the subscriber's address where the installation is to be made. The second economy is effected through closing the six retail storerooms and making deliveries from one central point, and by this centralization reducing the supply investment. The third economy is the result of operating a centralized minor repair shop in conjunction with the storeroom. When six storerooms were operated, it was necessary to make minor repairs to apparatus recovered within each of the six storerooms. With centralization, the volume of repairs at once became great enough to prove in piece work, thus effecting an economy in actual repairs, and a further economy in that work could be supervised by one foreman instead of the six required to operate the smaller repair shops under the district system. This centralization naturally brought about a considerable saving in clerical routine also.

"By locating the central storeroom in the same building with the Western Electric Company's warehouse, it was possible to cut down the average time of delivery from warehouse to distributing storeroom from one week to a few hours.

"The routine covering the handling of deliveries is as follows:

"All contract, plant and memorandum orders, on which apparatus must be delivered, are prepared at the close of each day by the night order force from subscribers' contracts, inspectors' recommendations, and written requests from subscribers for change in apparatus, received up to 5 P. M. on the same day. Copies of all such orders are delivered at the central storeroom prior to 5 A. M. of the next day. These orders

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are then assorted by address into delivery districts and turned over to selectors. Cardboard containers are provided, designed to take complete standard station equipments of various types, including directories. These containers are stamped with the type of equipment which they contain, and the selector attaches thereto an envelope containing a copy of the contract order, noting on the outside of the envelope the delivery address.

"Packages to be delivered by each wagon are then placed on hand trucks in the order in which they will be loaded on the wagons; that is, routed by deliveries. The wagons report at 7:30 A. M., are loaded with equipment, the drivers are given copies of their respective route sheets, and by 8 A. M. have started to make deliveries.

"Apparatus disconnected at subscribers' premises is removed by the workmen to the nearest central office, from which place collections are regularly made by the power wagons and the material returned to the central storeroom. Our average cost per delivery, including all charges, is $.114; our average cost per recovery, $0.21. The average cost of delivery by horse-drawn vehicle, which was tried out before we decided to purchase power wagons, was $.176. The use of power wagons in connection with this Central Storeroom has reduced our annual expense from $79,624 to $64,037—a net saving of $15,587 per year.

"The Shop service presents a straight delivery problem, comparable with any outside trucking business, and for that reason will not be gone into in detail in this discussion.

"Statement 'E' shows the expense of operating the 4,000 to 6,000-pound truck used by the Shop for the year 1911, from the time it was put in service, up to and incpluding December. A similar record is maintained for all of the 53 commercial vehicles, 14 touring cars and 97 runabouts owned by the company. Data are taken from daily reports sent in by the drivers, and at the end of each month the supervising forces are provided with these statements which show the expense of the current month, and all the previous months in the year.

"It seems probable that the telephone man, not directly interested in outside plant work, does not realize the magnitude of the trucking problem involved in building and maintaining telephone plant. A perusal of this article might, therefore, lead most of us to believe that the company had entered more extensively into the use of power trucks than a proper degree of caution would seem to warrant. As a matter of fact, we are hiring on the average, approximately five times as many horse-drawn trucks as we have power trucks in service. Our total expense for hired trucks during the year 1911 amounted to $385,559. It is estimated that 50 per cent. of this expense was due largely to the very extensive outside plant development work carried on during the year 1911.

"We now hire approximately 100 horse-drawn trucks per day. A large part of these are used in loop work, and it is safe to assume that we will continue to hire trucks for this service for a number of years to come, or until such time as a power truck is developed which can be purchased at a price bringing the annual charges as low or lower than the annual charges on the horse-drawn truck. This holds true because the nature of the work keeps the truck in the field, but idle, for a large part of the working day. Hence the problem is not one of economy in transportation so much as economy in standing idle.

"In the traffic congested sections of a city like New York, our experience has been that we could not afford to use power trucks of other than the inexpensive light delivery type. The horse-drawn truck is so much in evidence that the power truck is limited to about the same speed with an investment approximately three times as great. Here the horse-drawn truck must be eliminated before the power truck can come into its own."

STATEMENT "C"

Comparison of Motor Vehicles With Horse-Drawn Vehicles

Detail of Operating Expense and Saving made by One-Ton Truck Used to Supply Material to Splicers

Annual Operating Expense One-Ton Mack Truck Based on Performance of 15 Trucks, Average 10,300 Miles

Chauffeur's Salary (Including Full Time and Overtime)	$864.00
Garage and Washing	216.00
Gasoline (.018 per mile)	185 40
Lubricants (.008 per mile)	82 40
Tires (.026 per mile)	309.00
Supplies (Miscellaneous)	52.50
Repairs	150.00
Depreciation, Interest and Taxes	599.00
Team Hire on Account of Truck	236.00
Total	$2,694.30

Approximated Gross Annual Saving on Horse-Drawn Vehicle Replaced by One-Ton Mack Truck in the New Jersey Division.

Newark, Material Wagon per day	$5.25
Orange, Material Wagon per day	5.00
Clerk on Newark Wagon per day	2.00
Clerk on Orange Wagon per day	2.00
Total per day	$14.25
Total per year 290 days	$4,132.50
Additional Truck Hire for Special Work	30.00
Total	$4,162.50

Approximated Gross Annual Saving by One-Ton Mack Truck		$4,162.50
Annual Operating Expense One-Ton Mack Truck	$2,458.30	
Team Hire	236.00	2,694.30
Net Annual Saving		$1,468.20

Fifty Runabouts For Telephone Use.

Having obtained a full measure of success with its Sampson trucks, 20 of which have been placed in service during the past year, the Western Electric Co. has still further increased the efficiency of its organization by the purchase of 50 Brush runabouts for the use of the linemen of the New England Telephone & Telegraph Co. At the same time, a Stoddard-Dayton "Saybrook" four-pasenger touring car was purchased for the use of the Telephone company's division superintendent at Boston.

England Extending Motor Mail Service.

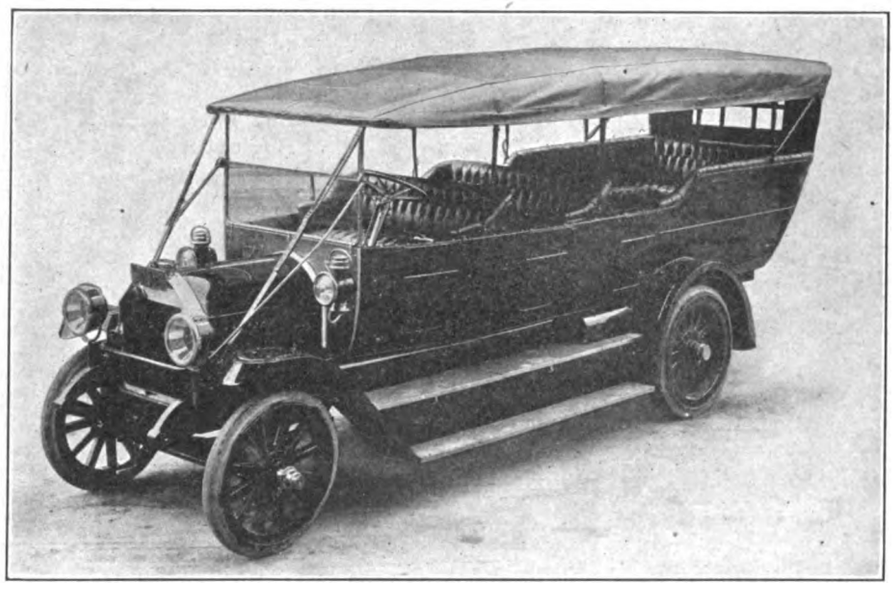
As a direct outcome of the successful venture of transporting mail matter by motor truck from London (Eng.) to Birmingham, British postal authorities are preparing to place themselves in a position where they will be still less dependent on the railroads and shortly will extend the service to include Manchester and intermediate points. The new service is planned along the same general lines of the old, which has been in effect a little over a year with gratifying results, post office employes traveling with the trucks and sorting the mail en route. Stops will be made at several intermediate points for collection and distribution, the trucks being capable of carrying 4,640 pounds, which it is estimated will permit the transportation of some 20,000 pounds of matter a week. Two trucks will be used and they will be started from either end of the route at such time as will permit their arrival at Manchester and London at about 6 o'clock every morning. The success of the service, says Consul Albert Halstead, of Birmingham, in substance, indicates that the British General Post Office will by degrees largely increase the carriage of parcels by motor truck, which development of mechanical traction, he continues, shows a most decided upward trend, not only large commercial firms, but also companies engaged in collecting, carrying and delivering freight gradually turning to motor trucks in preference to the railroads, which have for a long time enjoyed a trade which has almost amounted to a monopoly.

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"RUBBERNECK" WAGON MODERNIZED

Detroit Designers Evolve a Body Suggestive of the Touring Car—Seating Capacity Ingeniously Retained.

In attacking the problem of producing a passenger bus that shall be serviceable as well as of pleasing appearance, the General Motors Truck Co., Detroit, Mich., has cast out conventional designs entirely and brought out a brand new type of vehicle that scarcely can fail to prove popular with the sight-seeing public. As a general rule, those who have occasion to ride in sight-seeing buses give little concern to the appearance of the conveyance; they are there to see and unless they are unusually fastidious it makes little difference to them whether they are seen or not. Still, even the most fastidious passenger could have little fault to find with either the riding qualities or the appearance of the latest product to be marketed under the insignia G. M. C.



G. M. C. BUS THAT RESEMBLES A HUGE TOURING CAR

It is not an easy matter to design a well-appearing bus, because of the necessity for the maximum seating capacity available. Consequently most buses appear clumsy and top-heavy, and in the majority of cases they live up to their appearances and are neither easy to handle nor are they the acme of comfort from the passengers' point of view. In the new G. M. C. bus, however, a pleasing exterior has ben obtained by following closely the general lines of accepted practice in touring car design and as a result the vehicle does not in the least resemble the usual type of "rubber-neck" wagon. As may be seen by the accompanying illustration the vehicle resembles more the conventional touring car, except that it is rather elongated, the wheelbase being 142 inches, the resemblance being increased by the high flush sides and enclosed driver's compartment.

Even in the matter of seating arrangement the bus resembles an ordinary touring car, there being two cross seats behind the driver's seat and a big roomy tonneau. The total seating capacity is 16 passengers, not counting the driver, and entrance to all the seats is effected by means of side doors. The body is mounted on a standard model two-ton G. M. C. chassis, the engine being of the four-cylinder, vertical, water-cooled type and having cylinders which measure 4x6 inches bore and stroke, respectively. Power is transmitted from the engine to the rear wheels through the intermediary of a dry multiple disc clutch, four-speed selectively operated, change gear mechanism and side chains. The first of the new buses to be finished already is in service in Seattle, where it is employed to convey sight-seeing parties through the Rainier National Park.

Two Buttons For Six-Cylinder Starters.

It is not always possible to start a six-cylinder motor equipped with an automobile gas starter simply by depressing the starter button on the dash, for unless the crank shaft is in such a position that the circuit breaker of the magneto is closed, no spark is produced in any of the cylinders, and firing is therefore impossible. Shifting the spark lever sometimes will close the gap, but the practice is not to be relied on. If a second push button is "bridged" across the terminals of the breaker, however, a spark always can be produced simply by depressing both buttons at the same time and the engine starter thus is made much more reliable.

Rim Attention That Is Worth While.

Though many times it has been advised that rims on which quick-detachable tires are mounted be cleaned periodically, the reiteration of the advice serves to give emphasis to the fact that such proceeding is essential if the tires are to live up to their calling and present no difficulty to quick and easy removal. The advice is especially timely in the spring, when the roads generally are moist, to say the least. Experience points that unless quick detachable tire rims are kept in good condition, free from rust and dirt, the removal of tires may be a great deal harder than it would be if the rims were of the clincher type. This may be explained by the construction of the clincher rims which is such that there is less opportunity for water and dirt to work in between the tire and the rim. However, clincher tires often are just as hard to remove as quick-detachable tires, and if difficulty is to be obviated care must be taken to keep the rims clean.

Why Tire Chains Require Attention.

Though it has been advocated that tire chains should be so adjusted that they "creep," in order to cause even wear all around the tire tread, care should be taken to see that they are not loose enough for the cross chains to strike the mudguards, in which event not the least damage which may be expected will be the loss of paint from the guards; the chains themselves may be broken and lost. The noise of a chain incessantly slapping against the mudguard is an abomination, of course, and it is a simple matter to tighten the chains a little, or, if a cross chain is broken to cut it off with a cold chisel and a hammer. When a cross chain is removed, however, a new one should be put in its place at the earliest possible moment. Otherwise there remains a large enough section of the tire unprotected by a chain to cause a violent skid, which always is imminent under such circumstances, because with the brakes applied the wheel will continue to rotate, traction being maintained by the chains, until the bare spot comes in contact with the road when the wheel will slide.

Indication of a Worn Needle Valve.

A carburetter that persists in dripping when the throttle is closed usually will be found to have a worn needle valve that requires grinding to its seat. Use a very fine grinding compound for this work, one which is not composed of emery, the particles of which will embed themselves in the brass and keep the valve and its seat in bad condition.

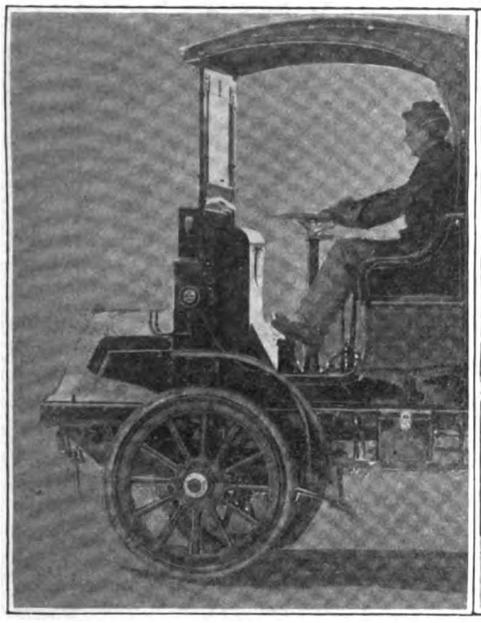
In time an accumulation of carbon is likely to result from the practice of turning off the gas and letting the acetylene lights die out. While an occasional cleaning of the burners is not a serious job, it can be avoided by blowing out the lights first and turning off the gas afterward, according to the suggestion that comes from abroad. It is somewhat of a question, however, whether the game is worth the candle, but in any case the blowing out of the lights is apt to be followed by a waste of gas, if nothing worse happens, should the shutting of the valve be neglected.

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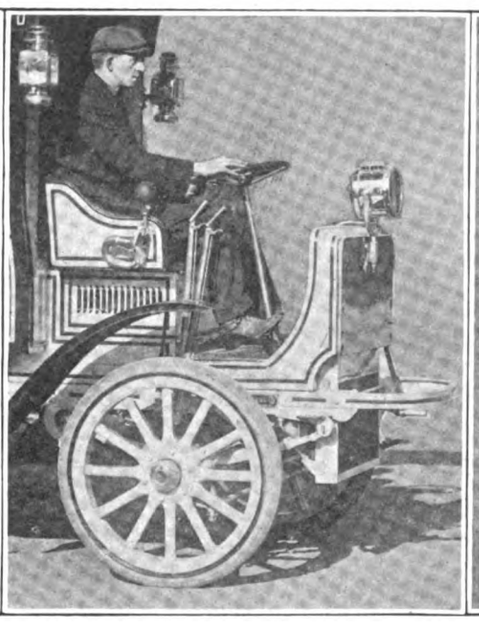
TRUCK PROBLEMS: PROTECTION FOR THE RADIATOR

Rarely Considered by the Average Person, This Necessity Affords Remarkably Wide Scope for Engineering Ingenuity—Varying Devices and Designs That Have Been Developed and That Are Employed—Position of Radiator and Not Protecting Devices a Solution Often Advocated.

An ounce of prevention, so the saying goes, is worth a pound of cure, and in no field of endeavor has the truth of the adage been more clearly demonstrated than in the design and manufacture of motor trucks. Intended for rough work in rough places, so to speak, there is need for preventives, which, if not wholly unnecessary on pleasure cars, are inadvisable or so stout or heavy as to detract from their appearance; therefore when they are employed on cars they assume lighter or more ornamental shapes.



GRABOWSKY CONSTRUCTION



AUTOCAR FRAME FENDER



SPEEDWELL RADIATOR GUARD

Protection for the radiator is a case in point. Radiator construction, that is, the construction of the cooling surfaces themselves, varies but slightly in commercial car practice from the construction adhered to in pleasure cars, and the inherent trailness coupled with the forward location, which generally is adhered to renders it a particularly vulnerable point at all times and especially in the case of vehicles frequently used in congested traffic. Rigidity of the radiator frame, the method of mounting it on springs so that the warping of the chassis under heavy load or bad road conditions has little or no effect, and means of protecting the radiator from injury are points which distinguish commercial vehicle practice from pleasure car practice.

The traffic conditions under which the commercial vehicle works, amid trucks both horse drawn and motor propelled, laden with all sorts and sizes of articles, and the class of help into whose care the vehicle is entrusted, make the protection of the radiator a not unimportant problem. The solution which perhaps is the first to be thought of is to shift the position or the location of the coloing device to a more protected spot, and, indeed, this has been resorted to with success in several instances. On the Lippard-Stewart truck, for instance, the radiator is located directly in front of the dash and partially straddles the motor, in a manner similar to foreign pleasure car practice. The location has much to recommend it, for besides the excellent protection from injury through collision, a degree of accessibility is reached which only in rare instances obtains where the forward location of the radiator is adhered to. The position of the radiator is such, however, that the use of a fan to render cooling more certain when the vehicle is standing with motor in operation is more difficult.

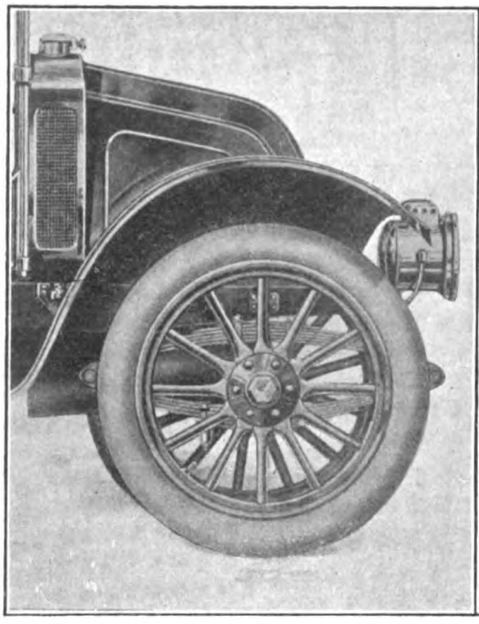


HEWITT RADIATOR GUARD

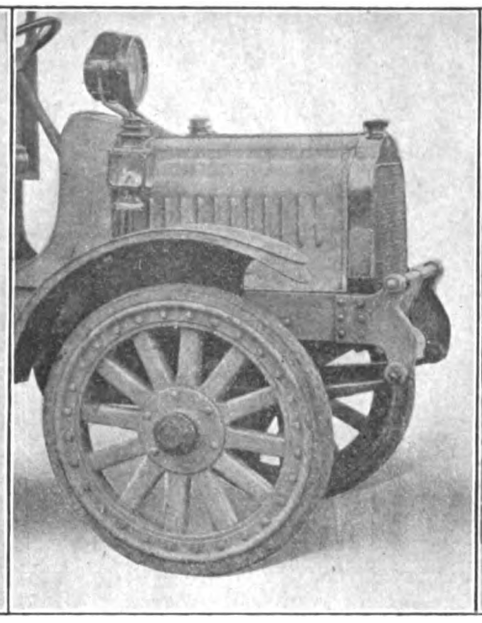
An unusual practice where the radiator is located on the dash, is to position the radiator so that the bottom clears the top of the hood. The air then has free passage through the radiator to a hood, which houses the fan, and which encloses the radiator on the side facing the driver. It serves to conduct the air below the floor boards. This position does not detract from the cooling qualities of the radiator, and still it is fully protected, and the accessibility of the motor is unimpaired. The practice is exemplified by the Grabowsky wagon, wherein the motor is housed forward in an accessible position in front of and below the radiator.

The use of a bumper to ward off the blows which otherwise would demolish the

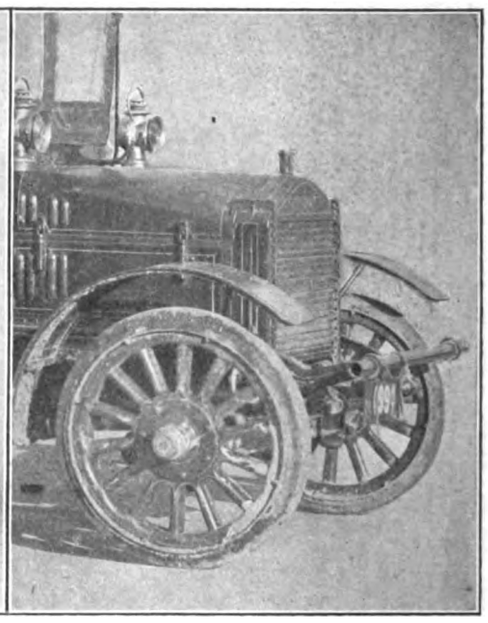
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LIPPARD-STEWART DESIGN



WALTER RADIATOR FENDER



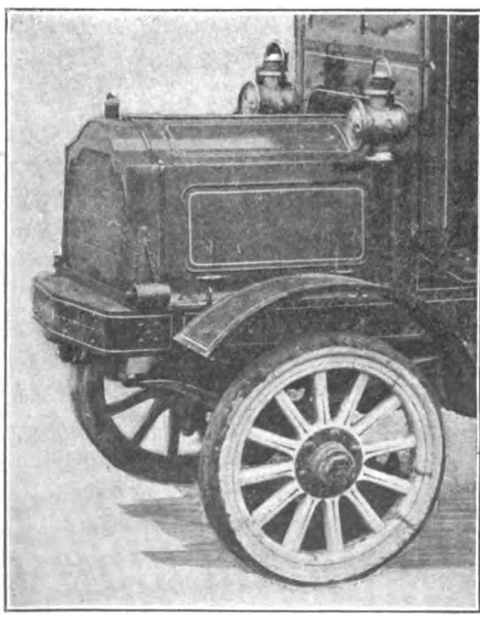
PIERCE-ARROW BUMPER

comparatively frail radiator, is much commoner on the commercial vehicle than is the case on pleasure motors, and as a rule, the bumpers are of more rugged construction. Unlike pleasure car practice, the bumpers generally are riveted directly to the side frame members without the intermediary of springs to partially absorb the impact shocks. On the Pierce-Arrow the bumper takes the form of a straight tubular bar supported rather low with regard to the radiator by two drop-forged hangers, while Walter trucks employ a solid bar supported by two rather heavy brackets which serve also to anchor the forward ends of the supporting springs.

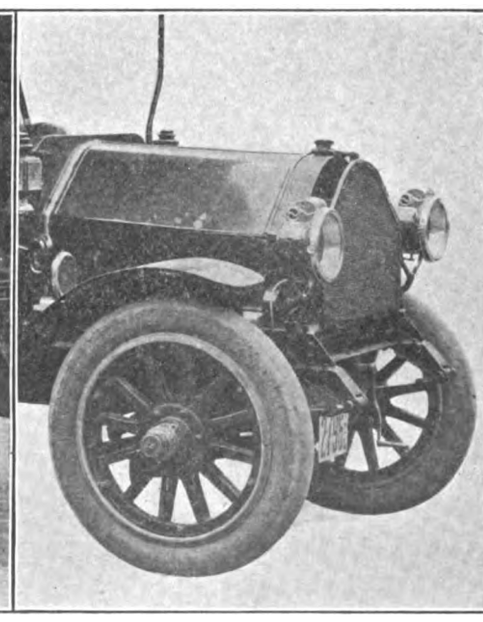
The bumper used on the Autocar is more or less distinctive, being formed of channel steel of rather smaller cross section than the frame member, which is curved around the low hung radiator in the shape of a bow. Speedwell practice is somewhat similar, in that the radiator is hung low and the bumper is of channel steel.

With a great many of the commercial vehicles, especially the heavier trucks, the bumper consists of nothing more than an extension of the main frame, the front cross member serving to protect the more vital parts of the machine. This practice is followed both when the motor is mounted under a hood, as is the case with the Packard, and when mounted under the driver's seat, as exemplified by the Gramm.

One of the most radical departures in a method of radiator protection has been worked out by the designers of the Hewitt truck, who, working on the theory that the radiator is susceptible also to shocks of lesser magnitude, have fully protected the radiator by covering it with a heavy wire mesh screen, which is bolted directly to the radiator frame. This protective screening is capable of withstanding quite a heavy blow. The Velie also employs a wire netting before the radiator, supported by brackets, which keep it about half a foot from the cellular radiator. The Eckhard truck has a radiator of very rugged construction, which is protected by a frame extension and also by an iron grating bolted to the radiator frame. In fact, the positioning of the radiator and the providing of means for its protection is an interesting study in itself, and involves far more thought than appears on the surface, even to those who own many trucks.



PACKARD FRAME EXTENSION



VELIE SCREEN GUARD



GRAMM RADIATOR LOCATION

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WHEN GASOLENE COMES IN SEALED PACKAGES

The "Designing Engineer's" Assistant Takes Another Long Look Far Ahead and Sees Standardization Now Unthought Of — There Are Obstacles, He Admits, and His Dream Is Interrupted But He Persists, Nevertheless.

"Hello, 'Foureyes,' I just came up to get an insight into the spring wheel trade as it will be in 2012, for I guess you must be ripe to tell me what will be the final design of those 'Rubber Trust' busting devices," exuberantly exclaimed the man from down stairs, as he took a seat at the draughting table opposite the designing engineer's second assistant.

"Look here, young fellow, you're in the wrong place, and likewise you are talking to the wrong individual," chuckled the second assistant. "Take up a newspaper and glance at the 'Personal' column until your eye lights on the name of a good clairvoyant. You know the kind—one of those crystal charmers who can tell you your name if you supply all of the letters, and who will guarantee to lay bare your past, present and future for the insignificant sum of five dollars. If you can't obtain an accurate description there, I guess you never will. Anyhow I'll never attempt to even describe the spring wheels we have now, much less those which are to come."

"Well, well, well, well!" was the taunting response. "You do not mean to tell me that the subject doesn't hold enough interest to make your attention worth while, do you?"

"I won't put it that way. I'll just say that the subject is a trifle too deep for me and let it go at that."

"H-m-m! That's too bad. I fancied that I was introducing a subject of endless possibilities, a subject on which you could talk from now until doomsday without thought of draining you dry. I thought probably you had exhausted your fund of information on the question of fuel economy and would unwind a dissertation on something else. I am just in the humor to listen to one."

"One thing at a time. I told you the last time you were up here that I had in mind 101 different ways for the conservation of fuel, and I only mentioned two. For this fuel-saving proposition is every bit as interesting and inexhaustible as the spring wheel subject, and not nearly so monotonous. Why, I hardly can glance over the papers without seeing something which makes me think of the design of the motor cars of the future. Did you read the papers this morning? Notice that article on the banquet of the In-Er-Seal Society?"

"Why, yes; but for the life of me I can't see what connection a 'blow-out' of the selling force of the National Biscuit Co. has with the reduction in the price or on the use of liquid fuel in automobiles."

"You're not as bright as I thought you were. But you hold your horses and maybe I can show you the connection. There was a time, not very long ago—you remember it and I remember it—when soda biscuits, or soda crackers, as we used to call them, came packed in large wooden boxes. They were sold by weight, and a pound would fill a large bag to overflowing. Still there were times, after a siege of damp weather generally, when the crackers would become soggy and moist and unfit for use. Then someone got an idea and jumped at it. A neat little carton built of paraffined cardboard and lined with paraffined paper was designed, and the biscuits were placed in these moist-proof packages immediately after being taken from the oven. Proper exploitation of the advantages of the 'In-Er Seal' packages, coupled with a well-managed advertising campaign, embodying a well-chosen name for the product, produced results truly wonderful, so that nowadays most of the crackers we purchase are packed in moisture-proof packages, and the sales are so enormous that the companies' salesmen now have an annual 'feed' and jollification. The reasons for the success of the products so packed are more or less self-evident — cleanliness and convenience.

"The practice of packing things, or protecting the foodstuffs from the ill effects of the atmosphere and from the hands of meddlers has extended considerably since that innovation, so that we now purchase our bread, our butter, our tea, coffee and cereals—in fact, an endless number of things, packed either in oil paper or in cartons. And the practice is not confined to foodstuffs, either. Articles of clothing, handkerchiefs, collars, etc., come done up in sealed packages so the meddling hands of the 'bargain rusher' in no wise impair the appearance or value of the articles themselves, and substitution on the part of the tradesman is impossible.

"Sh-h! Don't interrupt me.

"Now consider the relation of all this to the automobile industry. For the last several years there has been a very marked tendency which has spread so that most of the major parts of the modern machine are designed within limits. All of the screws, nuts and bolts are cut standard. The designers of motor trucks now are agitating the adoption by the S. A. E. of limits for truck chassis design, limits which include capacity and speed as well as flexibility. All this standardization leads toward one end—interchangeablility which spells convenience. It is not at all unlikely that in the years to come the practice of making things standard and hence more or less interchangeable will reach the fuel tank and a standard location will be chosen, a standard capacity adopted according to the power of the motor, a standard contour or shape of course will be the vogue. The location probably will be determined by the method employed to feed the carburetter; if gravity feed is provided for by the designer, the location will of necessity be chosen so that the gradient of the road will in no wise impair the flow of the liquid; with the force fuel feed the tank can be placed lower than with the gravity system, however, the tank will be placed in a position readily accessible. Tanks, intsead of being supplied with the cars, as a part of the cars, will be supplied as a unit similar to the gas lighting tanks, now so common. The turn of a thumb screw will suffice to fasten the tank in place in the brackets provided for by the manufacturer and some kind of an automatic coupler will insure the rapid and positive connection with the fuel supply pipe.

"Do you see the connection now? The gasolene, alcohol, or whatever the future fuel will be, will come supplied to the consumer in sealed tanks. This will make for safety and convenience in handling and will insure the quality as well as the quantity of the fuel supplied, for both will be guaranteed by the corporation or corporations which charge the tanks. The seal naturally will preserve the contents from being disturbed by the garage man and evaporization of the lighter elements likewise will be prevented."

"Oh, yes; I follow you perfectly, but I'm afraid you are flying your kite too high. A tank to hold 45 or 50 gallons and be strong enough to be portable and resist the tendency to be dented and bent beyond recognition must be made of rather heavy material, and the weight of the fuel itself, added to the weight of the container, would go a great way toward limiting the adoption of the interchangeable sealed tank fuel supply system, on the grounds of convenience, at least."

"Who said that the tank was to hold anything like 50 gallons?"

"Well, most of the cars you see nowadays carry sufficient fuel for a half-decent run. It is not likely that the designers of the future are going to limit either the scope of the vehicle or so limit the dimensions of the fuel tank that refilling will be necessary. That stands to reason."

"Right, and yet the fuel tanks are going to be smaller, according to my way of looking at it, and the condensation will be brought about by retreatment of the fuel—retreatment which will make it contain many more heat units per unit of weight than the fuel now employed, which will mean that less fuel will have to be used to produce the same power and as a consequence either the radius of operation of the vehicle will be increased, or the fuel tank will be made smaller. Then, too, so

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many things will have been done in the way of motor improvement that the consumption of fuel per brake horsepower will be greatly diminished, if I am not greatly mistaken."

"But——"

"How? Oh I don't know. I have a faint idea, but my friendship with the organic branch of chemistry is not sufficiently well developed to permit me fully to explain. Roughly, I think it will be something like this: The available heat units in a pound of gasolene are in round numbers 20,000, while in an equal quantity of hydrogen there are three times as many. Obviously the introduction of hydrogen into the gasolene would produce the desired effect. Just how this will be done, time will tell, but that it will be done I am certain. Synthetic chemistry, although practically in its infancy, has produced many, many articles of commerce at a price much below that of the natural article, and from sources unsuspected as the abode of such articles or products. For instance aniline colors, in years gone by, were obtained by the rather costly process of distilling indigo. Today practically all of the colors are obtained from petroleum products, from the coal tars which formerly were thrown away as waste products, and the change has been brought about by research work done by chemists. Very many similar cases could be named, but I will spare you. Really, now, it does seem to be within the bounds of possibility that the fuel of the future will be 'superheated' in some way or other, doesn't it?"

"Better ask your chief, I'm not encouraging such dreams," and with a quizzical smile the man from down stairs made haste to return to his desk.



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1,005,626. Adjusting Mechanism for Lamps for Automobiles. Arthur James Farrell, Pittsburgh, Pa. Filed May 5, 1911. Serial No. 625,138.

In a lamp adjusting mechanism for vehicles provided with a steering gear, a worm on the post of the steering gear, two vertical lamp supporting shafts journaled in bearings carried by the side frames of the vehicle, a beveled pinion on the lower ends of each shaft, a pair of horizontally extending shafts journaled in hangers carried by said side frames, beveled pinions on the forward ends of said shaft and meshing with the pinions on the lower ends of the vertical shafts, beveled pinions on the rear ends of said shafts, a transversely extending shaft journaled in hangers carried by said side frames and provided with beveled pinions meshing with the pinions on the rear ends of the horizontally extending shafts, a worm wheel on said transverse shaft meshing with the worm on the steering post, rearwardly extending cranks carried by said vertical shafts, and a connecting bar pivotally attached at its ends to said cranks.

1,005,627. Tire. Michel F. Fiset, Jr., and Louis A. Fiset, Albany, N. Y. Filed Nov. 21, 1910. Serial No. 593,581.

1. A tire comprising a casing, a plurality of individual resilient cells mounted in the casing, each of said cells having an open end and an enlarged portion which abuts against the adjacent cell, and a metallic cap fitted over said open end and bearing on the inner surface of the casing.

1,005,845. Odometer. Joseph W. Jones, New York, N. Y. Original application filed Aug. 7, 1908, Serial No. 447,447. Divided and this application filed Oct. 4, 1909. Serial No. 520,948.

1. The combination of a numeral disk or wheel adapted to be rotated in a forward direction to give a desired indication; a spring exerting tension to rotate the disk in a rearward direction while permitting unlimited rotation of the disk in the forward direction, one end of said spring having fixed connection to the disk and the other end of said spring having an anchorage adapted to be shifted by the forward rotation of the disk; means for retaining the disk in any position to which it is moved by forward rotation thereof; means operable to release said retaining means thereby freeing the disk to be rotated in a rearward direction by said spring; and means for arresting the disk in a zero or starting position when thus rotated by the spring.

1,005,863. Automobile. William L. Miggett, Ann Arbor, Mich. Filed Dec. 31, 1909. Serial No. 535,730.

1. In an automobile, the combination of two driving wheels, a shaft adapted to drive each of said wheels, said shafts converging toward a point at a distance horizontally from the axis of said wheels, and a balance gear located adjacent to the point of convergence of said shafts adapted to rotate said shafts and to permit independent motion of said shafts.

1,005,873. Tire Protector. Charles .R Ragsdale, St. Louis, Mo. Filed June 2, 1910. Serial No. 564,546.

1. A tire protector comprising a plurality of pairs of laterally curved shields formed with outwardly turned hooks on their sides a plurality of pairs of oppositely disposed spring-controlled hooks mounted inside the felly, a plurality of pairs of fixed hooks supported on the sides of the felly but outwardly of the spring-controlled hooks, and flexible connections extending between the sides of each pair of said shields, the fixed hooks and the spring-controlled hooks.

1,005,960. Pneumatic Tire. Robert B. Gray, Port Carbon, Pa. Filed Oct. 14, 1909. Serial No. 522,579.

In combination with an outer tube, a series of open-ended separate tubes of varying diameters within the same, and removable collectively or individually therefrom, a normally-closed air chamber arranged transversely within the casing and comprising an outer wall an inner wall.

1,005,962. Non-Pneumatic Elastic Tire for Vehicle Wheels. Oscar Grenier, Boulogne-on-the-Seine, France. Filed Oct. 11, 1910. Serial No. 586,451.

In a non-pneumatic elastic tire for vehicle wheels the combination of an inner tube, balls and plugs embedded in said tube, single strips made of suitable material and

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forming independent sections wrapped around said tube and an outer tube inclosing the whole and a tread cover adapted to receive the outer tube.

1,005,969. Explosive Engine. Charles D. Heaton, Jr., Providence, R. I. Filed June 22, 1910. Serial No. 568,318.

In an engine, in combination with a plurality of cylinders, the outer end walls of the cylinders being formed with valve seats, a valve including a rod of solid cross section disposed in said seat and having portions projecting on opposite sides of said cylinder walls, said rod being formed with an inlet and an exhaust port for each cylinder, said ports being of substantial arc-shape in cross section and having mouths of sufficient length so that the ends of the mouths extend beyond opposite sides of the cylinder end walls to establish communication between the cylinder interior and exterior and a casing for each valve port carried by the cylinders.

1,006,017. Variable Speed Gearing. Charles C. Spinks, Washington, D. C., assignor to M. C. Spinks and M. A. Poor, Memphis, Mo. Filed July 2, 1910. Serial No. 570,100.

1. In a device of the kind described, a shaft having an eccentric head, a mutilated gear loosely mounted on said head, and having a radial recess, a stationary pin extending into said recess, an internal gear adapted to be engaged by the first mentioned gear and given a step by step movement, a second shaft, a gear on said second shaft, and a larger gear connected with the internal gear and meshing with the gear upon the second mentioned shaft.

1,006,033. Carburetter. Garhardus L. ter Weer, Detroit, Mich., assignor of one-third to Sybren R. Tymstra and Johannes H. Figee, Detroit, Mich. Filed July 19, 1909. Serial No. 508,327.

1. In a carburetter, a conduit adapted to connect with an engine, a vertically disposed air conduit open at its lower end and communicating at its upper end with said first mentioned conduit, said air conduit being provided with a valve seat at the top thereof and intermediate the ends thereof and directly below said valve seat with an enlarged portion therein, an oil feed nozzle positioned centrally of the enlarged portion of the air conduit, and an open ended double cone valve positioned in the air conduit and surrounding the oil feed nozzle, the upper end of said valve being normally seated on the valve seat at the top of the air conduit and the lower end of said double cone valve extending below the point of greatest width of the enlarged portion of the air conduit.

1,006,055. Vehicle Wheel. Edward S. Bottomly, Martinsburg, W. Va., assignor to The Walk Auto Tire Company, Martinsburg, W. Va., a Corporation of Delaware. Filed Apr. 27, 1911. Serial No. 623,746.

1. In a wheel, the combination of a wheel center having a rim, a felly of larger internal diameter than the external diameter of the rim, and pairs of spiral springs interposed between the felly and the rim, each spring having a contracted outer end and a projection on its lower end extending toward and under the adjacent spring in the pair, and provided with a lug on its extremity to assist in positioning such spring; with a clamp plate interposed between the springs in each pair and engaging the extensions of both springs, a bolt for securing said clamp plate rigidly to the rim, and bolts passed axially through the outer coil of each spiral spring and securing the same to the felly.

1,006,064. Starting Device for Automobile Engines. John S. Clarke, East Cleveland, Ohio, assignor of one-half to Alexander H. Langell, Cleveland, Ohio. Filed Nov. 14, 1910. Serial No. 592,282.

1. In a starting device for automobile engines, an engine having a crank shaft, in combination with a tank and a fluid motor having valved communication therewith, and means connecting said crank shaft and said motor comprising separate gearing adapting reversal movements of said motor and separate means to control independent operations thereof for the purposes described.

1,006,219. Vehicle Wheel. Arthur C. Huckelbridge, Coldwater, Kan. Filed Feb. 8, 1911. Serial No. 607,353.

In a wheel, a combined rim and tire formed circular in cross section, said rim being formed in two co-acting sections, one of said sections being of lesser size in cross section than the other section, means for attaching the lesser section to the larger section to permit access to the interior of the rim, a pair of flanges formed integral with the larger rim section and projecting annularly and inwardly therefrom, said larger rim section between the flanges being provided with a series of equi-distantly disposed apertures communicating with the interior of the rim, a hub,

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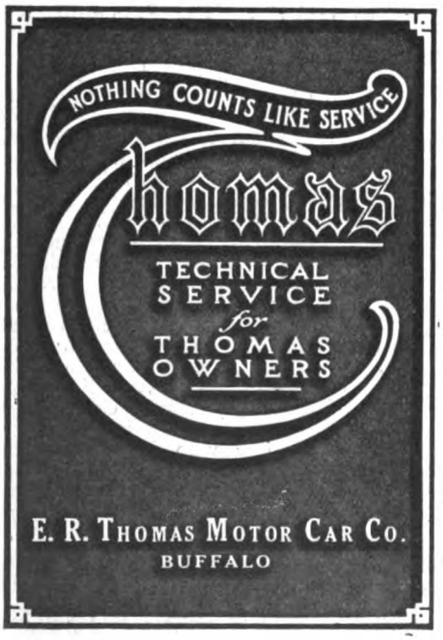
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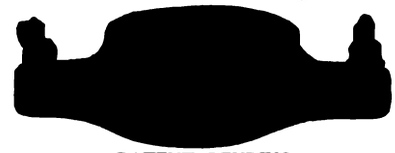
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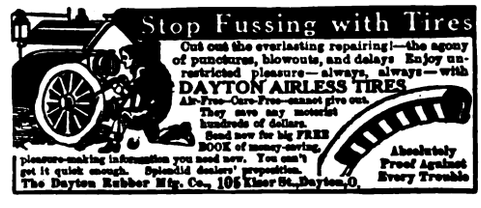
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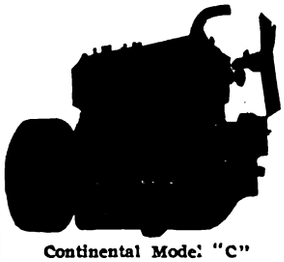
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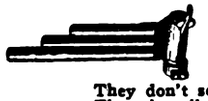
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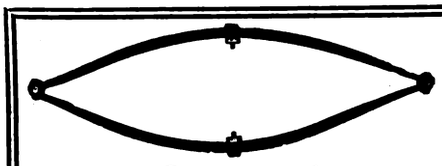
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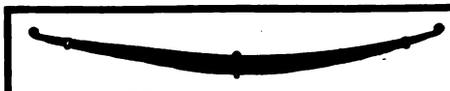
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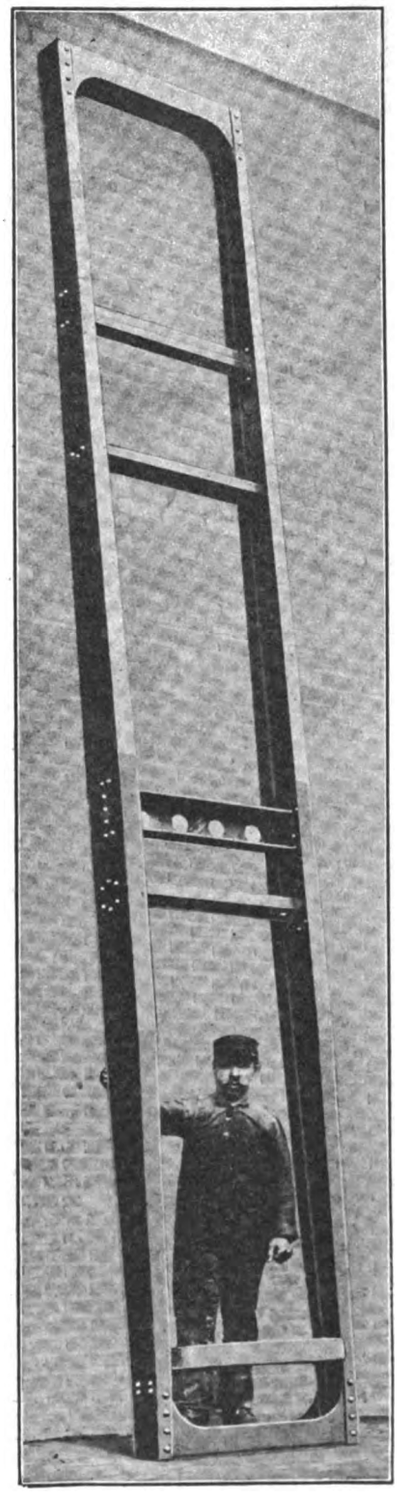
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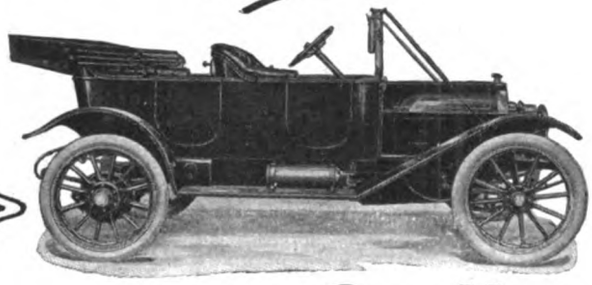
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9. Bore .....
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PITTSFIELD

True High Tension Magneto

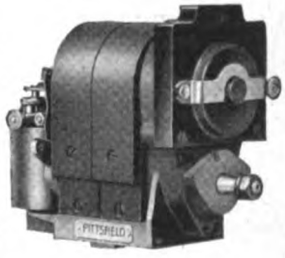
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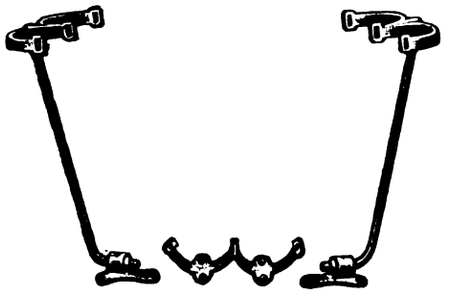
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Boston, Mass.

Dear Sir:-

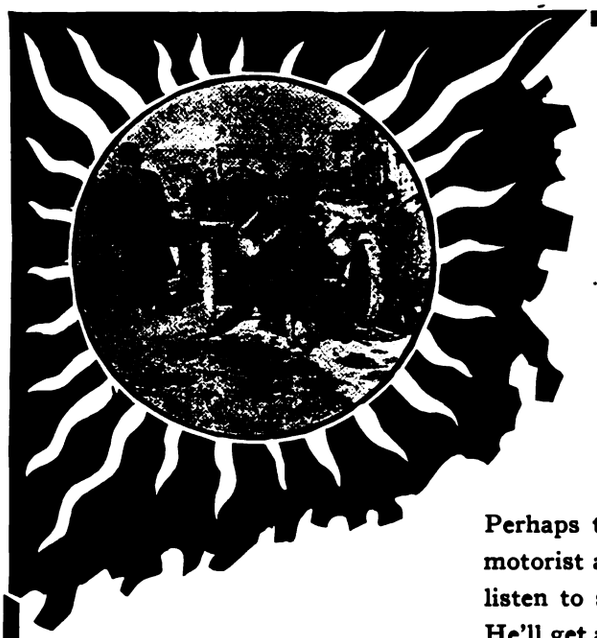
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Yours truly,

W B Thombs

A postal will bring a copy of letter like this from Remy Electric Co Indianapolis Ind

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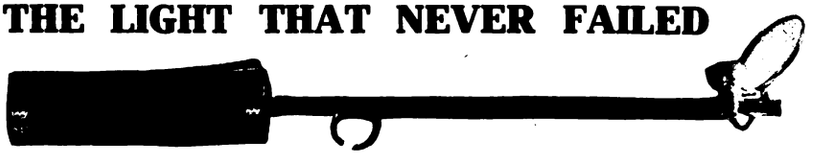


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THAT HE DOESN'T OWN A

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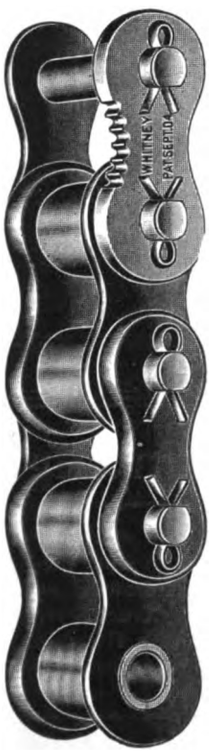
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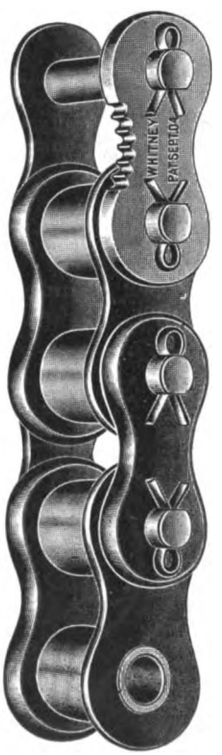
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The one self starter that scientifically and accurately measures your acetylene gas and then mixes it with air in your cylinders. Price $35.

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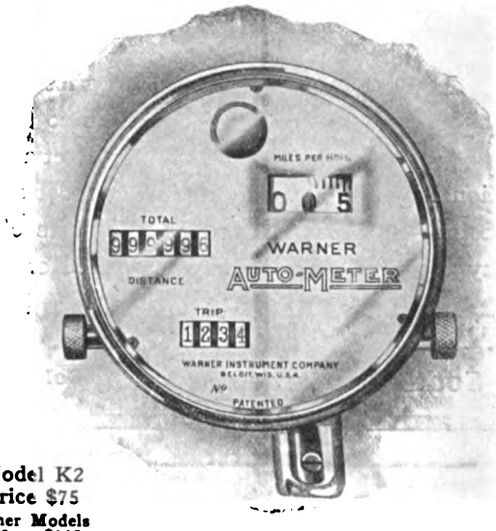
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Motor Trucks

HERE'S A PREDICTION

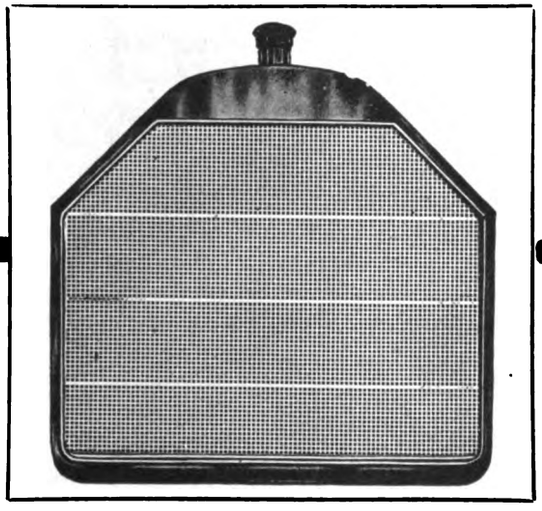
You'll want our agency some day if you don't close for it today.

Just tuck this away in your mind. There isn't a truck proposition in the industry that has more push and energy back of it than the Sanford.

Combine this enthusiasm and force with the wonderful product we are marketing and you have your answer to our prediction.

We'd rather be with you than against you. Won't you give us a chance to show you a selling proposition that has never been approached since the beginning of motor trucks?

The Sanford Motor Truck Co.
SYRACUSE, NEW YORK



THE BUSH RADIATOR

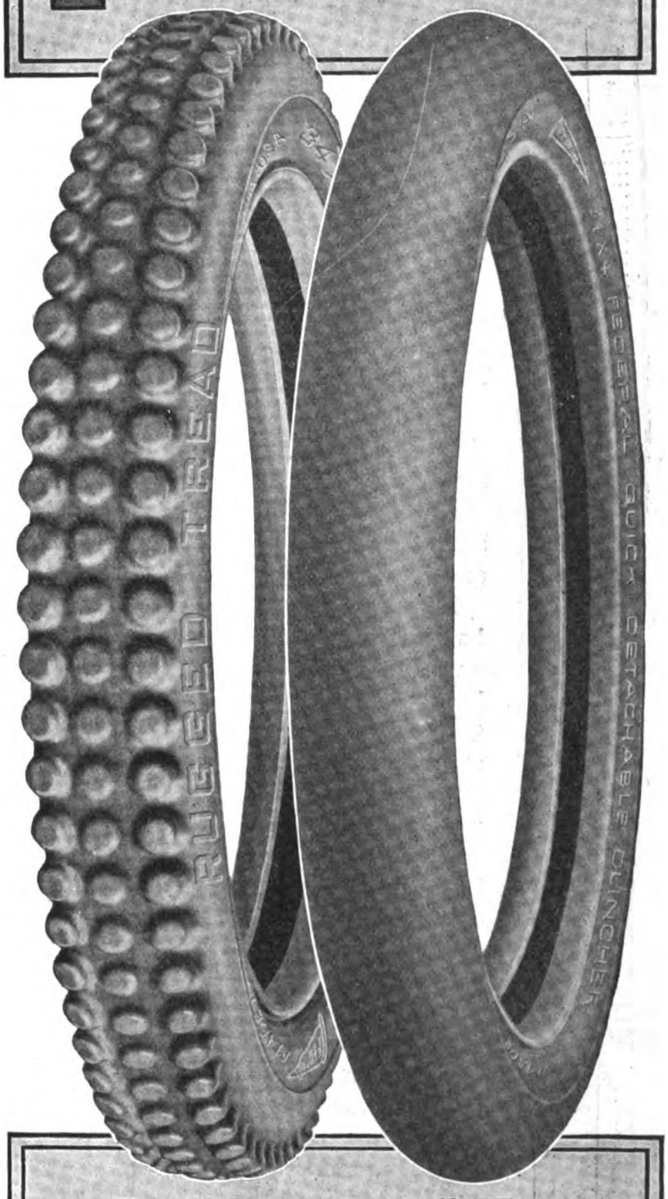
IN EFFICIENCY—The Highest
IN APPEARANCE—The Finest
IN CONSTRUCTION—The Simplest
IN SERVICE—The Most Satisfactory

"The Most Practical Radiator"

Ask those who have used them.

THE BUSH MFG. CO., Hartford, Conn.

FEDERAL



"Extra Service" Tires

Federal Tires are selected by tire users who demand the limit in mileage and endurance. They are "Extra Service" tires because they are *quality* tires through and through.

Federal Tires are made in Rugged Tread (non-skid) and Round Tread types, for all rims.

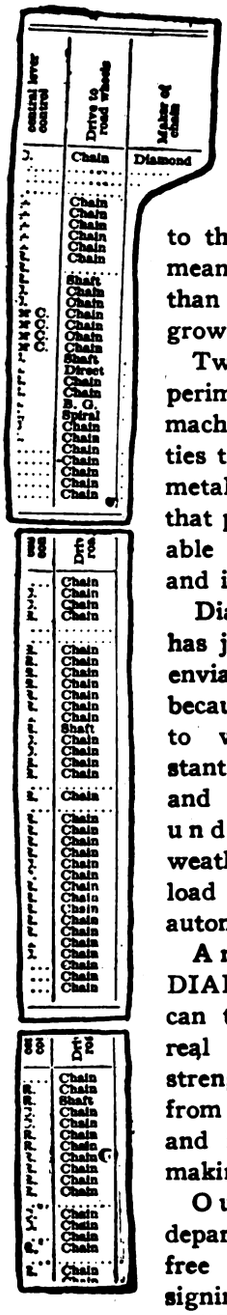
Federal Tires are supplied through leading dealers. Interesting tire book free.

FEDERAL RUBBER MANUFACTURING CO., MILWAUKEE

BRANCHES AND AGENCIES—*New York, Boston, Chicago, Kansas City, Minneapolis, Denver, Indianapolis, Columbus, St. Louis, Louisville, Omaha, Houston, San Antonio, Little Rock, Atlanta, Los Angeles, San Diego, Pasadena, New Orleans, Portland.*

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Isn't this good evidence that chain drive is best?



This list, clipped from a leading commercial vehicle paper, tabulates the drives on America's leading commercial cars as exhibited at the Madison Square Garden Show last January. It speaks for itself as to the supremacy of chain drive. It means that more chains are now used than ever and that chain drive is still growing in popularity.

Twenty-two years of constant experimentation and of improvement in machining and metal treating facilities to conform with every advance in metallurgy, enable us to build chain that pulls safely to the highest obtainable tension on the testing machine and in service.



Diamond Chain has justly earned an enviable reputation because of its ability to withstand constant severe duty and to wear well under the hardest weather, road and load conditions of automobile service.

Any user of DIAMOND Chain can tell you of the real superiority in strength, in freedom from serious wear and in the ease of making a repair.

Our engineering department offers free advice on designing problems.

Write for book "Chain Transmission of Power," or if you are a car owner, look for the Diamond trade mark on the side links when you buy your next chain.

TRADE ◇ MARK

DIAMOND CHAIN & MFG. CO.

150 W. Georgia St., Indianapolis, Ind.

CAPACITY 8,000,000 FEET PER YEAR

(123)

Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

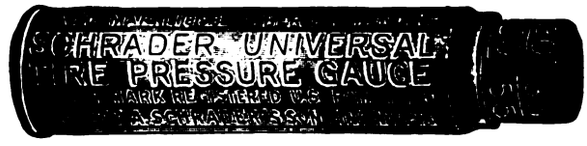
He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER UNIVERSAL Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each

Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.

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THINK THIS OVER

very carefully and read it twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly—tuned up to its highest power. Perhaps the valves pit—warp—go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

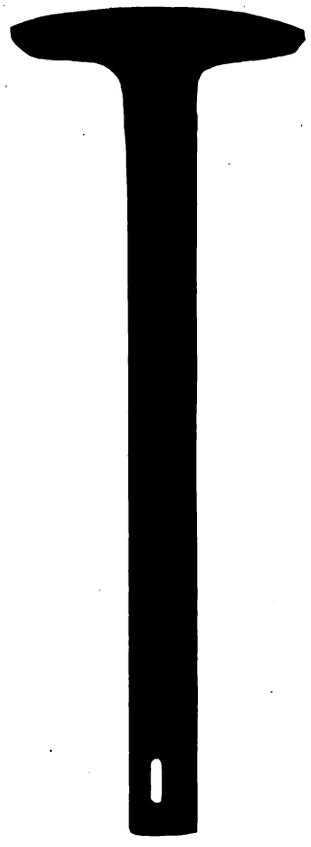
You cannot slight this part by putting in an inferior product—valves that will give trouble, or even break from inexperience in their manufacture—valves of unsuitable material, not suitably heat treated.

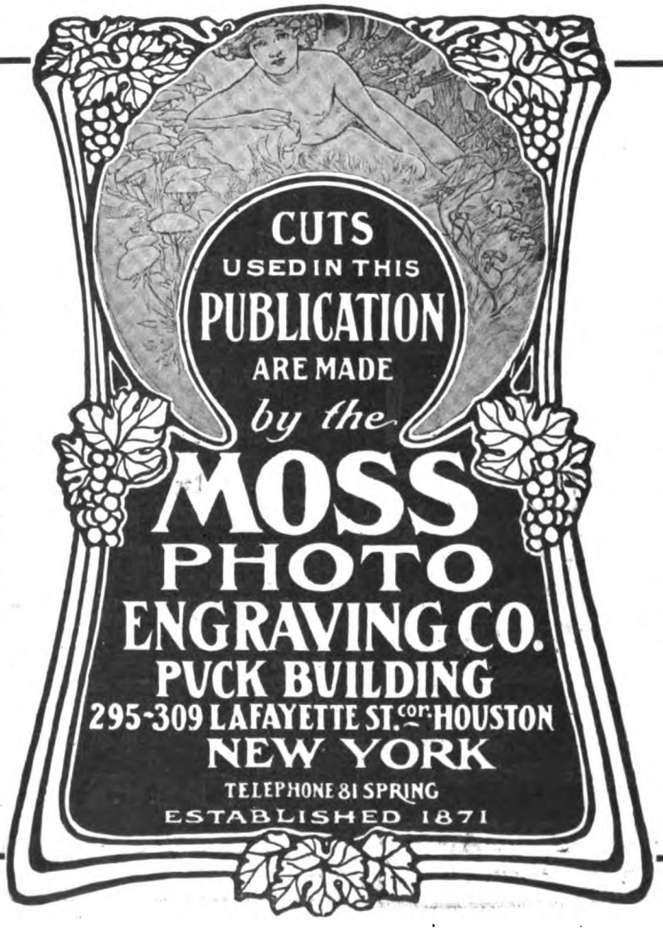
Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

THE ELECTRIC WELDING PRODUCTS COMPANY
CLEVELAND, OHIO





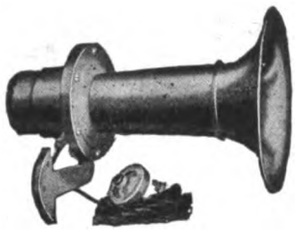
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The "Crankless" STARTER

By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.
Guaranteed by our 40 years standing and reputation.
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Long-Stroke "32"
Touring Car
$900 F. O. B. Detroit
Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.
Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

20 H. P. Models
Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

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We would build them better
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Established, able dealers are invited to write for information as to open territory. Both pleasure and commercial cars.

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Bare Chassis including Driver's Seat $1450 **Express Body $1500** **Panel Body $1600**

The first electric truck at a popular price. Write or wire for catalog and proposition.

M & P ELECTRIC VEHICLE COMPANY
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In no other lamps can you obtain the Solar Special Short Focus Lead Glass Lens Mirror Reflector—the patented system of double ray light projection which gives two distinct fields of light for town and country use—or the new and exclusive black finish with a metallic lustre which is unaffected by heat or moisture. All of these features are exclusively "Solar."

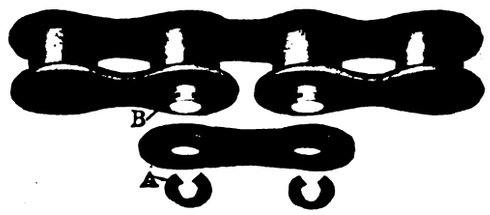
Do not equip your car or specify equipment to the maker until you have seen all of the Solar advantages. See Solars at any live dealer's or write for the catalog.

Solars are made in all styles for oil, electricity, gas and in combinations.

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Kenosha, Wis. (137) New York City

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are used by the largest, most exacting users of chains for automobiles in the world. They need no further recommendation.



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DREADNOUGHT

Moline

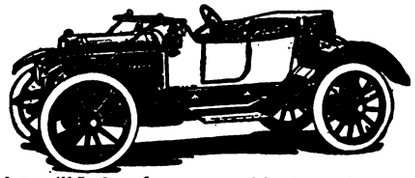
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4x6 Long Stroke Motor

unequalled in efficiency, silence of operation and durability. While rated at 35 H. P. this motor will actually develop almost 40. The Roadster shown here is only one of the four New Models of the "Dreadnought" Moline "35." Write for Folder No. 39 showing all styles, specifications and prices.



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Moline Automobile Company (11)
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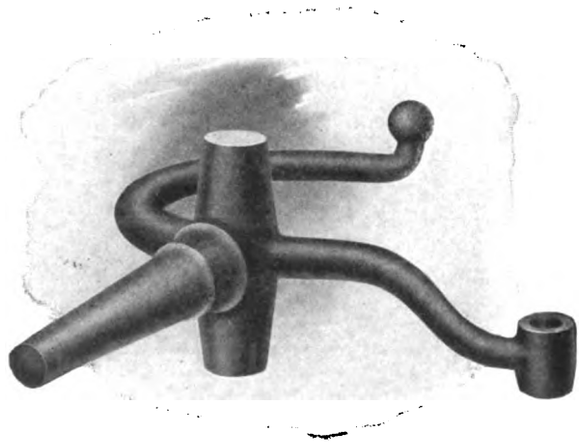
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The Hartford Auto Parts Co.

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Prompt Service Guaranteed

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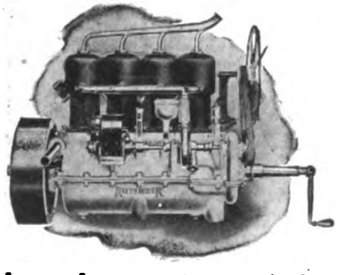
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Car makers interested in the Quality and Merit that means absolute safety and satisfaction will do well to write.

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There is a certain market for your cars if you put

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into the chassis. That has been the experience of about thirty automobile makers. Get into touch with us. Write for catalog.

THE WESTERN MOTOR COMPANY, Marion, Ind.



The superiority of

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is conclusively proven by the fact that they are used in the leading cars throughout the world.

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The World's First Maker of Sixes Exclusively

Ford

The Car of Vanadium Steel

The car which has won deserved popularity by reason of established merit.

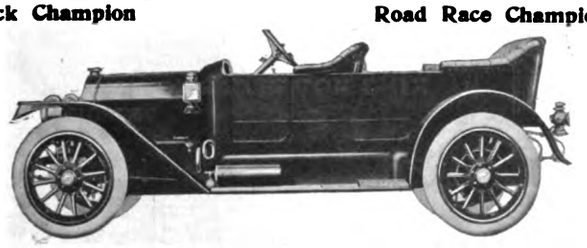
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Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY

1007 E. 22nd Street **Indianapolis, Ind.**

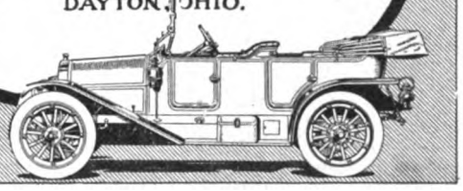
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THE SPEEDWELL MOTOR CAR CO.

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TORPEDO
4-Passenger
$2,700
Fully Equipped including Self-Starter



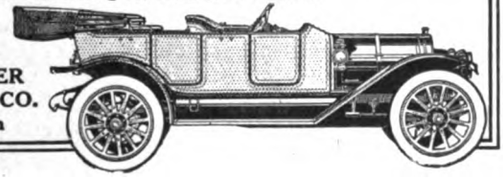
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PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY

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Five Passenger Touring Car

Model SS $950 Self-starter and other special equipment.

Standard Model $850 Fully equipped, but without self-starter and other special equipment.

HUPP-YEATS ELECTRIC COACH

"The first advance in coach-making in over a century."

Six models—$1750 to 5000

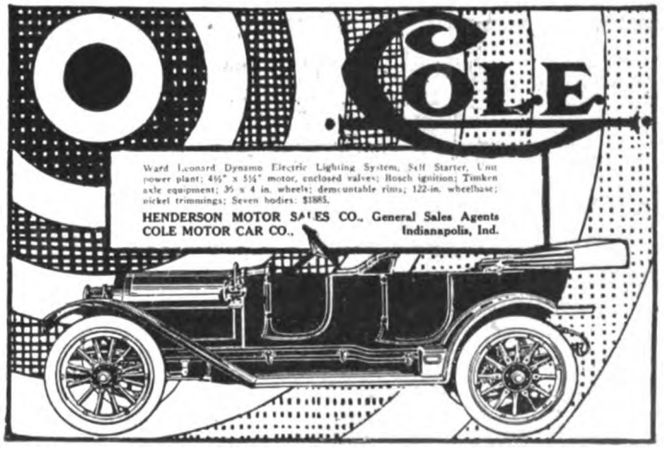
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Ward Leonard Dynamo Electric Lighting System, Self Starter, Unit power plant; 4½" x 5¼" motor, enclosed valves; Bosch ignition; Timken axle equipment; 35 x 4 in. wheels; demountable rims; 122-in. wheelbase; nickel trimmings; Seven bodies; $1885.

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are free from troublesome details, contain more up-to-date features and give more perfect results than others because of our years of experience. We have learned the lessons other makers have yet to learn and our product is proportionately better. Send for catalog.

APPLE ELECTRIC COMPANY
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Two types, a five-passenger touring car on a four-passenger torpedo-phaeton — six cylinders, thirty-eight horse-power.

Wheel base 123 inches—ample room for comfort but easy to handle.

Full-elliptic springs and a wood frame—road shocks are absorbed.

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Tires 36 x 4½ inches front, 37 x 5 inches rear—larger than any other car of this size.

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CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta, Minneapolis and San Francisco

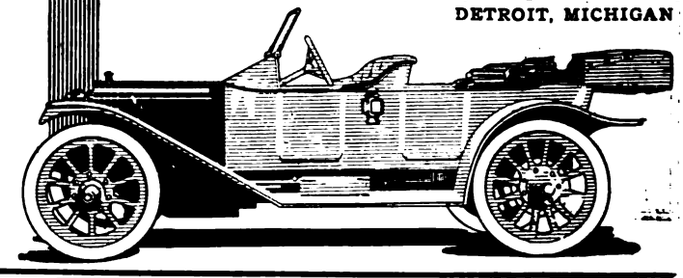
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With Full Equipment, Including Self-Starter, $1565

Terms, territory and detailed description on request

KING MOTOR CAR CO., 1314 Jefferson Ave., DETROIT, MICHIGAN

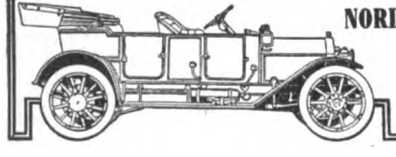


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INTERNATIONAL CHAMPION

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



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(Established 1851)
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Sixty Years of Successful Manufacturing

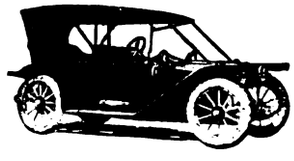
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$1200 to $3000
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Limousines, Touring Cars, Coupes and Roadsters

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The Little Aristocrat

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Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

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IT'S GUARANTEED
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With Decarbonizer
High Power Models Upward

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All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.
Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.
The Wm. Cramp & Sons Ship and Engine Building Company
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START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE
The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.
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Empire Tires

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EMPIRE TIRE CO., Trenton, N.J.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

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THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

K·D

The Motor With the Sliding Crescent Valve

KNIGHT-DAVIDSON

1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

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The Kinsey Manufacturing Company

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Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
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SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager, 1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

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AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

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Fool Proof—Because it has no complicated mechanism, only one moving part. Can't get out of order.

Swear Proof—Because it relieves you of the dirtiest and most disagreeable feature of automobiling.

Wear Proof—Because it is made of the best materials in the most careful manner.

Not a luxury but a NECESSITY if you want your tires to give good service.

Price $15.00 including 12 feet of hose, HIGH GRADE RECORDING GAUGE AND SELF OPENING VALVE CONNECTION.

Start the season right—ask your dealer or write us today.

THE BROWN CO., 1025 S. Clinton St., Syracuse, N. Y.

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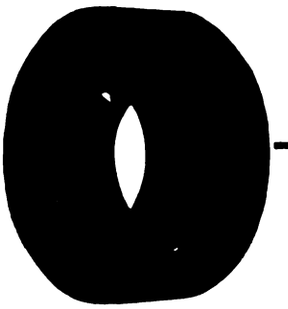
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Repair Parts For MORA Transmissions

We have in stock all parts for the transmissions of MORA automobiles. Write us for prices on any parts you may require and save money over having them made up special.

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Eliminate Noise in Your Car

Use Hyatt Roller Bearings





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Detroit, Michigan

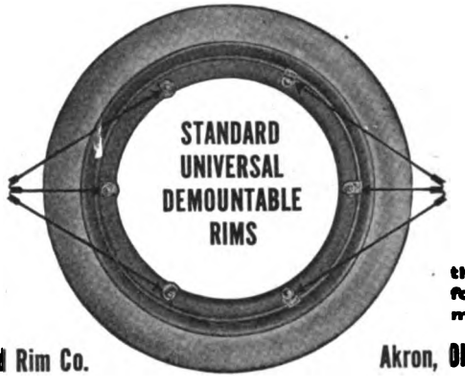
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Special Designs for Every Type of Motor Made

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Champion Spark Plug Co.
TOLEDO, OHIO

Two Turns LOCKS the Rim in Place



Two Turns UNLOCKS the Rim for Demounting

The United Rim Co. Akron, Ohio

Mais Motor Trucks

Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.

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FEDDERS RADIATORS

we would like to send our latest catalogue.

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"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500

(Completely Equipped)

The Fiat Agency Policy is One of Permanency

POUGHKEEPSIE **F.I.A.T.** NEW YORK

The Electric Car of Quality

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Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

COLONIAL ELECTRIC CAR COMPANY

Detroit, Michigan

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS SIX — HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

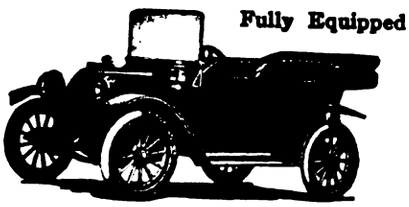
Full specifications sent on request.

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



35 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

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NEW YORK · PENNSYLVANIA · MASSACHUSETTS · WASHINGTON · DELAWARE · COLORADO · WISCONSIN · OREGON · MINNESOTA · RHODE ISLAND · OHIO

The Only Complete Car

Electrically Self Started and Lighted

Inter-State

Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
Model 41—4 Passenger Demi Tonneau.
Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke. 40 H. P. $2400

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Model 51—4 Passenger Demi Tonneau.
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Model 30-A—Fore-Door, a 40 H. P., 5 Passenger Touring Car at $1750
Model 32-B—A 40 H. P. Roadster at - - - - - $1700

All fully described in our Art Catalog. Send for one today.

In'er-State Automobile Co., Dept. 0 Muncie, Ind.

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MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY

607 Waterloo Street Detroit, Michigan

Motor Car Manufacturers Since

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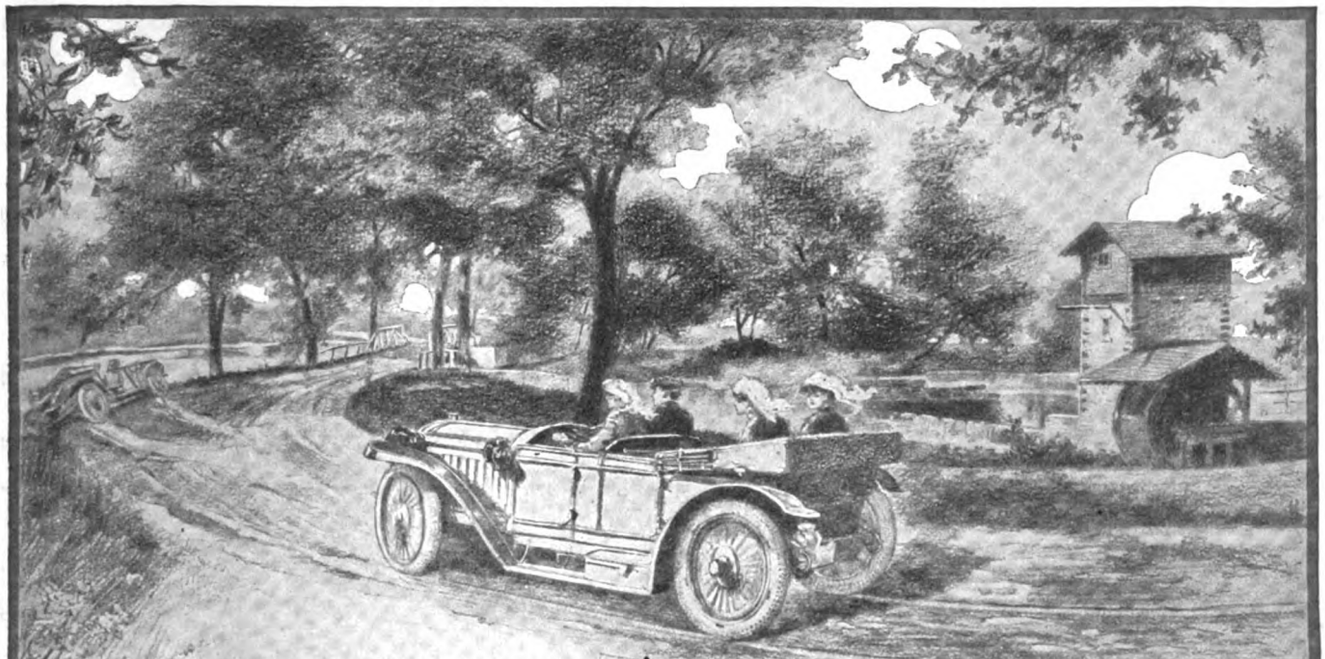
Occupying the newest and most modern automobile manufacturing plant in America.

HAYNES AUTOMOBILE COMPANY, Dept. T-8 Kokomo, Ind.

SHAWMUT TIRES

SOLD EVERYWHERE **SHAWMUT TIRE CO., Boston, Mass.**

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Avoid Skidding!

No one likes to be a passenger in a car traveling fast on a slippery road, unless the tires have a definite grip.

Chains are a short-lived nuisance. Tires with pattern and studded treads are useful when new, but too costly to be a true solution.

Yet it is possible to avoid skidding without the inconvenience of removing the non-skid device on dry days, and without the expense of special tires. And you can save from ¼ to ½ of the mileage cost at the same time, as compared with bare tires.

Woodworth Treads

are an efficient non-skid in wet weather, and a protector against wear in all weathers. Tourists who use them eliminate the tires from their list of worries.

WOODWORTH TREADS have glass-hard steel studs riveted into a soft chrome leather base. Stiff side springs draw the treads always snug on the tires, preventing chafing and heating. Punctures and cuts, together with resultant local rotting of the fabric, are averted. New tires, protected by Woodworth Treads, last about three times as long as when run bare. And repairs of all sorts are practically eliminated.

DEALERS! GARAGEMEN! You need Woodworth Treads in your business! Ask us to prove our claims by sending you a pair of Woodworth Treads on 30 days' trial, to be returned at our expense if not satisfactory. Send sizes and your business references—no money. Write to-day and learn the facts at our risk. Mention the Motor World and receive a handy leather key ring free.

LEATHER TIRE GOODS COMPANY
NIAGARA FALLS, N. Y.

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Buy "Kline Kars First Because Kline Kars Last"

The first American car to adopt the FOUR SPEED FORWARD TRANSMISSION at a price lower than the regular three speed ones acknowledged high grade.

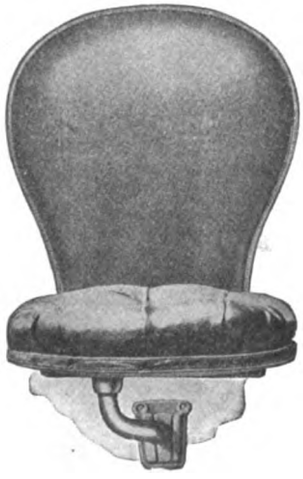
NOTE—All high priced cars have it. WHY? Because it saves fuel, operates easier and makes hill climbing a pleasure on direct drive. INVESTIGATE.

Four and Six Cylinder Models; Prices $1750 to $3500

Self Starter—AGENTS GET OUR PROPOSITION—Address:

KLINE MOTOR CAR CORPORATION, York, Pa.

Factories—York, Pa.; Richmond, Va.



Patent "Luxury" Folding Seats

Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

HODGE & GRAVES CO.,
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Any Kind
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Rims

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For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

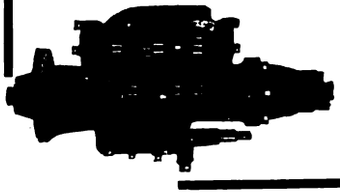
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R. B. ABBOTT SALES CO., Sales Agents, Detroit

COVERT Transmissions

for commercial cars have always proven successful.

They will stand the severest tests and all we ask of you is to let us demonstrate this fact on your own car. Your inquiries will be given every consideration.



COVERT MOTOR VEHICLE COMPANY

Sales Offices:
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Factory: Lockport, N. Y.

"Firestone" TIRES

Most Miles Per Dollar

THE FIRESTONE TIRE & RUBBER CO.

America's Largest Exclusive Tire and Rim Makers" Akron, Ohio

DUPLEX EXTERNAL BRAKES

Act Instantly—Forward or Backward

Duplex brakes produce maximum safety. They are America's leading brakes. Made by brake experts. Nothing so necessary as "quick acting" brakes.

Get a set of DUPLEX brakes. Inexpensive—easily installed. We build brakes to order. Write us today. Let us quote prices. Send for complete catalog.



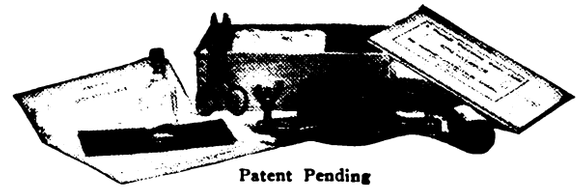
THE ROYAL EQUIPMENT COMPANY

436 Housatonic Ave. Bridgeport, Conn.

Manufacturers of Raymond Brakes, Raybestos Brake Lining and Gyrex—The Mixer.

WARNING

PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer

Ever-Ready

Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

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An Announcement

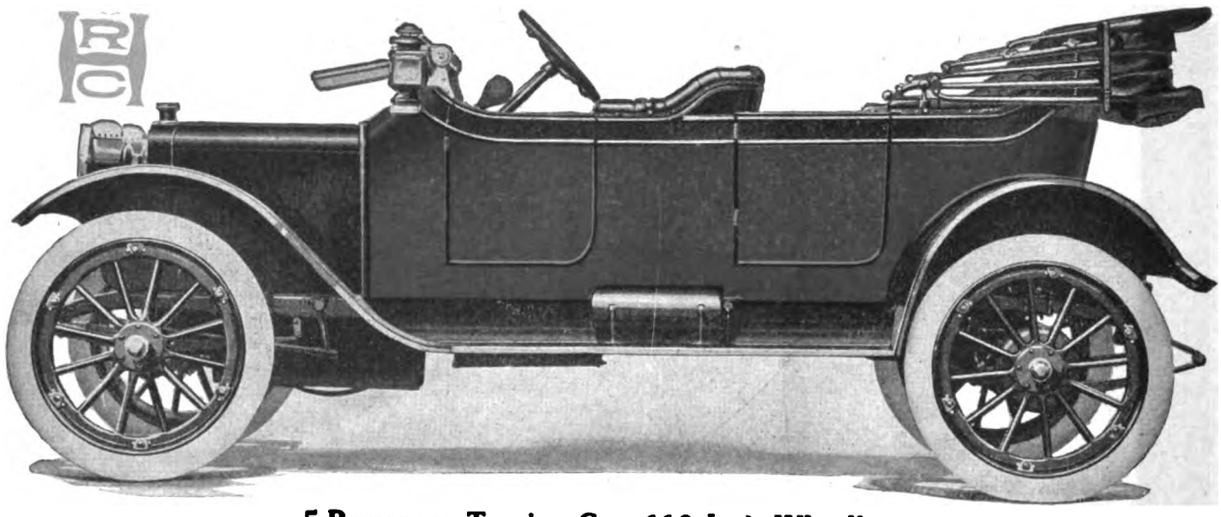
of vital importance to every Manufacturer, Dealer and Car Owner will be made in the near future. Watch for it and read it.

Manufacturers and Dealers Motor Fire Insurance Company
(TO BE INC.)

Manufacturers and Dealers Motor Casualty Company
(TO BE INC.)

1440 North American Building
Philadelphia

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5-Passenger Touring Car, 110 Inch Wheelbase

R-C-H

"Twenty-Five"

Standard Model

5 Passenger Touring Car—110 Inch Wheelbase

$850 F. O. B. DETROIT

Fully equipped with top, windshield, generator, side curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, 3 speeds, enclosed valves, Bosch magneto.

Model EE

$900 F. O. B. DETROIT

Equipped with 32 x 3½ tires, demountable and quick detachable rims, extra rim, Bosch Magneto, gas tank, wind shield, lamps, horn, tools and kit; and the famous Jiffy Curtains, which can be adjusted in an instant and make the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

General R-C-H Specifications.

Motor—4 cylinders, cast en bloc—3¼ inch bore, 5-inch stroke. Two bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left side.** Irreversible worm gear. 16-inch wheel. **Control—Center** lever operating through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame** Pressed steel channel. **Axles**—Front, I-beam drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

Wanted—1000 Dealers

Our selling problem this season has been a peculiar one. Naturally, our original aim was to get as wide a distribution as possible. But the demand for the R-C-H so far exceeded all expectations that our entire output for 1912 was speedily oversold. And this left many sections without R-C-H representation, simply because we could not supply the cars.

We shall manufacture this season in round numbers 10,000 cars. For the season of 1913 our output will be increased to 30,000 cars. Our present dealers tell us that they will take care of 15,000. That leaves 15,000 for sections where the R-C-H is not at present represented. And that in turn offers a golden opportunity to the right dealer in much of the best territory in the country.

We are keeping this announcement free from bombast, from "bunk," from "hot air," from all the glittering generalities that are handed you every day. We prefer, even, not to dwell upon the sales record of the car and its popularity with the public. You probably know it; or if you don't, ask your brother dealer in a town where there is an R-C-H dealer.

But ask yourself these questions: What does your public—the people to whom you must sell—demand in a car? And given two cars possessing all these features, would the average man prefer to pay a lower or higher price?

Of course the answer to the second question is self-evident. So let us consider the first. The average man wants in a car five things—sturdiness, comfort, beauty, power, roadability. We claim that no car at twice its price excels the R-C-H in these essentials. If this claim is true—and we ask only a man's judgment after he has seen the car himself—is not the R-C-H the best car on the market from the dealer's standpoint as well as that of the public?

This advertisement may seem a trifle premature. But we want ample time to consider carefully every application made to us. We want the best dealers—men who will stay with the proposition year in and year out; men who will take the same pride that we do in the R-C-H watchwords of good work, good value and good will; men who will put as much care into selling the R-C-H as we do into making it.

So write us today; tell us about yourself. For if you're the right man in the right place, we think the R-C-H offers you the best opportunity for a big business success that exists in the industry today.

R-C-H Service-Stations

R-C-H service and supply stations in all large centers will be a feature of our 1912-13 policy. Many of them are already in operation—a photograph of one is shown below. Others will be established as rapidly as possible; so that no R-C-H owner anywhere will be far from a base as well equipped to attend to his wants as the factory itself. In California or Maine, Minnesota or Texas, the R-C-H owner will be able to obtain repair parts within 24 hours.

R-C-H Corporation 104 Lycaste Street Detroit, Michigan

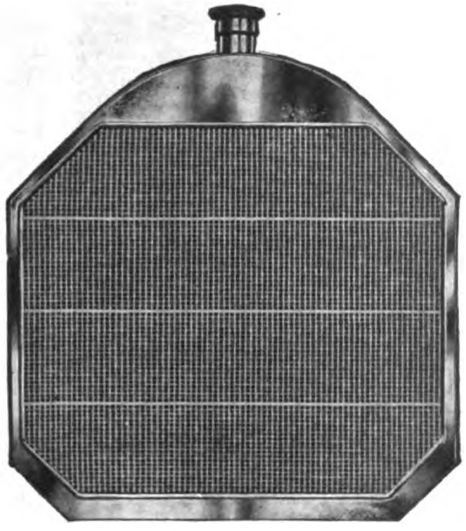
BRANCHES

ATLANTA, 548 Peachtree St.
BOSTON, 563 Boylston St.
BUFFALO, 1225 Main St.
CHICAGO, 2021 Michigan Ave.
CLEVELAND, 2122 Euclid Ave.
DENVER, 1520 Broadway
DETROIT, Woodward and Warren Aves.
KANSAS CITY, 3501 Main St.
LOS ANGELES, 1242 South Flower St.
MINNEAPOLIS, 1206 Hennepin Ave.
NEW YORK, 1989 Broadway
PHILADELPHIA, 330 North Broad St.



R-C-H Service Station
Lycaste St. and Jefferson Ave., Detroit, Michigan

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The Mayo—the radiator thoroughbred

¶What better recommendation can an antomobile radiator have than its satisfactory service on the majority of quality cars. MAYO Radiators are more than good in quality and service—they are better than the best.

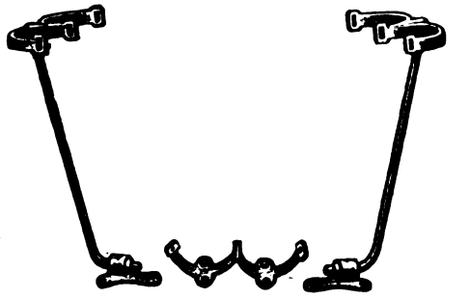
Mayo Radiator Company

NEW HAVEN, CONNECTICUT

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES

"Torpedo" Tire and Demountable Rim Holders



Designed especially for use on Torpedo body or Fore-door cars Set consists of two strong arms firmly bolted to running board and permitting of sufficient adjustment to accommodate two tires or demountable rims, of standard sizes, 4 inch or smaller. Made of solid Brass and guaranteed to give perfect satisfaction.

Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

	Brass	Black
Price, complete with Straps...	$4.00	$3.00

A dozen other styles and sizes in stock. See catalog.

Our 1912 Catalog, which is held as a book of reference by manufacturers, dealers and automobile owners, will be mailed on request. Circulation limited to 100,000 copies.

Chas. E. Miller

MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

HOME OFFICE

97-99-101-103 Reade St., New York City

ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

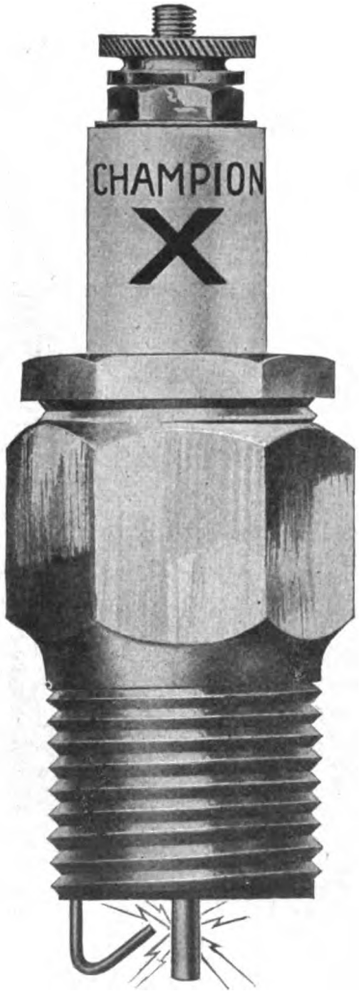
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PHILADELPHIA, PA.—318 North Broad St.
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CHAMPION

TRADE-MARK

Champion Spark Plugs



CHAMPION X
75 Cents

Wise motor car men profit by the experiences of others. Tourists, motorists everywhere, tell you of the merit of Champion Spark Plugs. They have found that the Champion is invincible in strength and service. It is the plug you want.

Such statements are not idle talk. Note the great 1912 record of Champions. More than sixty out of every one hundred cars made this year are equipped with Champions. This means that twenty-five per cent of the factories of the country specify Champions. The two biggest producers in the country—Ford and Overland—specify them.

The Champion quality and certainty are its salesmen. It is the universal spark plug.

You will never buy an obsolete Champion; you can't find it in stock. At the end of each year a dealer is urged to exchange his old models for the most improved ones. Agents who find a preference for conical type plugs may exchange other styles —and vice versa.

They come in the box bearing the "world" trademark. The name "Champion" is on the porcelain also. Manufacturers and agents write us today.

CHAMPION SPARK PLUG CO.

Dept. C, Toledo, Ohio

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"Crankless" STARTER

Starts 100 Times out of 100

Guaranteed by our 40 Years in Business

Stalling your motor doesn't affect the Crankless Starter.

Just force a charge of fresh gas and air into your cylinders, and away you go.

Stalling with most starters means cranking your car. But never with the Crankless. Take off your crank if you have a crankless self starter. You don't need a crank, ever.

Just press the Button with your foot. If once in a score of times this does not suffice—use the injector. (See diagram below).

$20

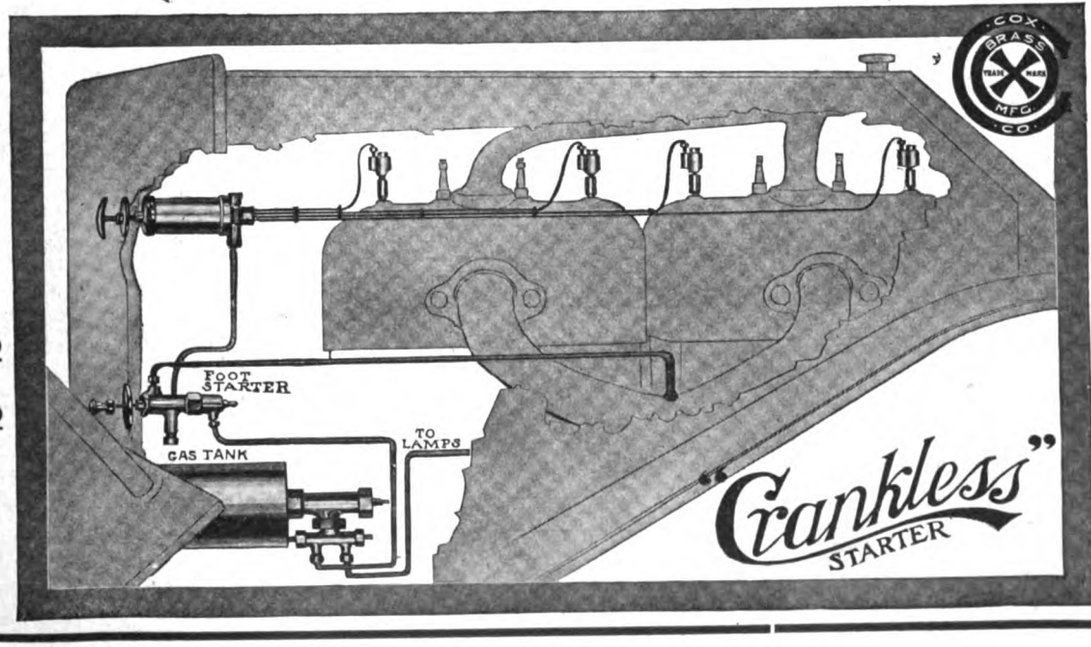
Without Cylinder Attachments

The injector is like the spare tire—when you don't need it—don't use it. But when that "once-in-a-while-that-you-do-need-it" comes, it's fine business to have the injector handy.

Cox Brass Manufacturing Co.

(Established 1872)

ALBANY, NEW YORK



Extra for Cylinder Attachments

4 Cylinder $10.00

6 Cylinder $15.00

OFFICES

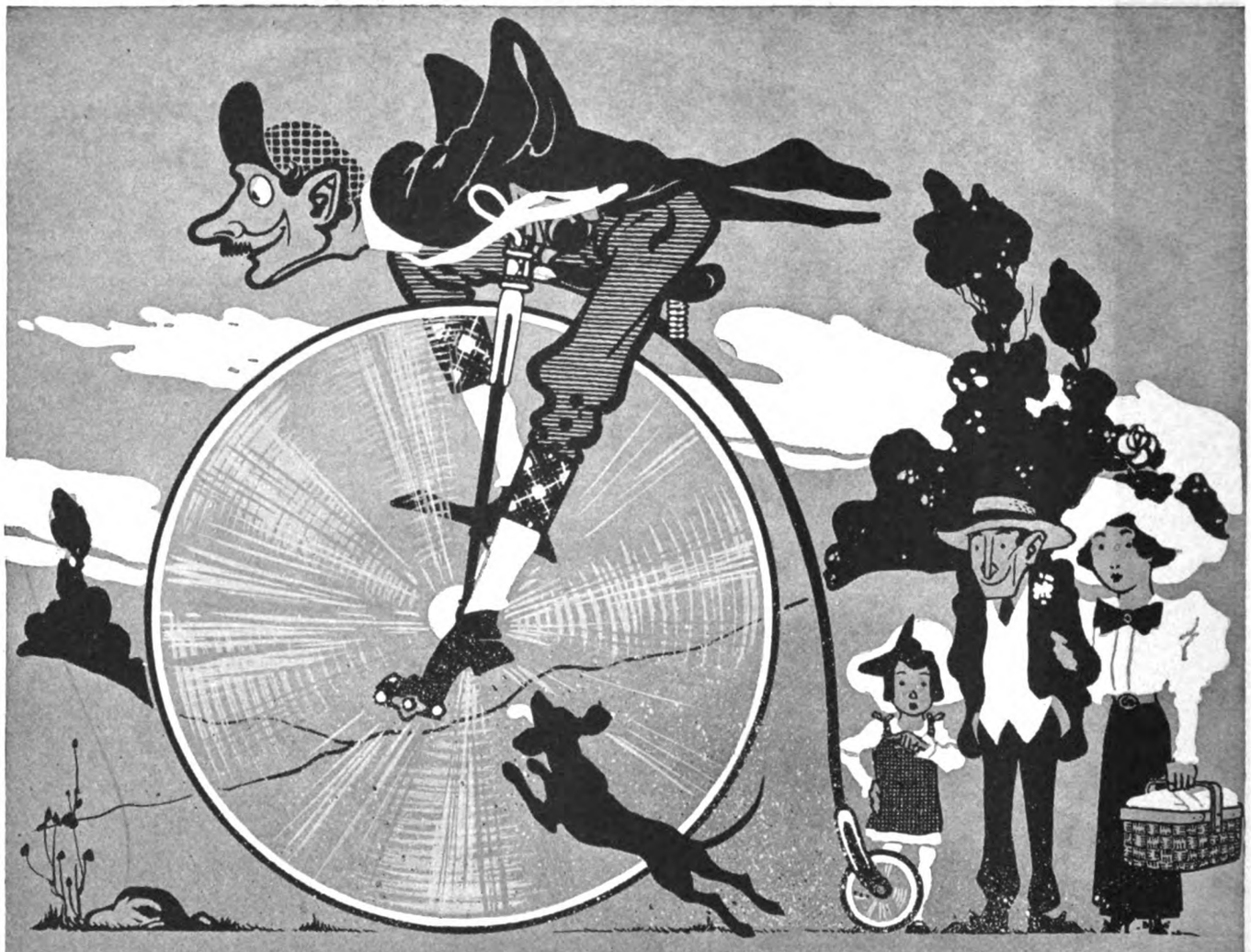
ALBANY, N. Y.
Pearl and Van Woert Streets

NEW YORK CITY
1777 Broadway

BOSTON, MASS.
899 Boylston Street

DETROIT, MICH.
870 Woodward Ave.

Digitized by Google



You Paid $100 for Your Bicycle—Your Boy Gets a Better One for $25

For years after the first wheels were made, good bicycles cost $100. The initial investment had been so *tremendous*, and the cost of making each machine was so great, that you and the rest of the public had to pay the price. It wasn't because they were *better*—it was *only* because they were *fewer*.

With the Stewart & Clark Manufacturing Co. making eighty per cent of the speedometers used in America, every other speedometer factory is forced into the position of the old time bicycle makers. His *prices* have to be *high* because his *output* is so *low*. He can't *divide* his expense by the same great annual *volume*, so the user "pays the freight."

The Stewart Speedometer is a *better* speedometer and sold at a *lesser price*.



Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial—big figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft—drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB"

Stewart & Clark Manufacturing Company

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston Kansas City Cleveland Philadelphia Minneapolis Indianapolis London Paris

Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

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Detroit, Mich., May 9, 1912.

Yesterday and Today

In the year 1645 the first automobile—a toy—was built by a Jesuit priest at Pekin, China. This car was propelled by steam from a small boiler, discharged toward the rear against vanes, the latter being suitably connected with the running gear to drive the car forward.

"Oructor Amphibius" was the first car built in America. It, also, was propelled by steam and was designed to run both on land and in water. In 1786 Oliver Evans, having constructed the machine under patent from the state of Delaware, ran it down Chestnut Street, Philadelphia, and into the Delaware River, and up the Delaware to Trenton.

The first Gas Engines, about 1870, weighed in the neighborhood of 1800 pounds per horse power. One very small machine built at that time—about eighteen inches high—was popularly rated at one "dog" power. Even as late as 1895 the weight per horse power was as high as 200 pounds.

How different then would be the state of motor car building today if the past twelve years had not seen most marvelous developments as compared to what went before. Gas cars of high power weigh less than would the very smallest engine alone in those early days. And the refinement, mechanically, of every other detail has been in proportion.

The more exacting problems have been worked out most carefully by men scientifically trained and devoting their entire thought to the subject. This is especially true of roller and ball bearings—without which the motor car would cease to be of practical service.

There are arguments on the relative merits of various types of bearings of the better class. It would pay every motor car owner as well as every builder to become familiar with some of the chief differences and peculiar advantages. Methods of manufacture as well as principles of design should be considered.

Some of these features have been described in a booklet entitled "Anti-Friction Bearings." We will gladly send a copy to any interested party on receipt of inquiry addressed to the makers of superior Hyatt Flexible Bearings.

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Never Another Puncture!



No delays, no disappointments, no exasperations! No tire repair expense! You now can enjoy that kind of auto riding every day of the year in any kind of weather on any kind of road. Never again need you struggle on the roadside with a punctured tire—never again pay out a dollar for tire repairs!

And you have the pleasure not only of ease of mind—but of supremely easy riding, for in these trouble-proof tires the problem of perfect resiliency without air has been solved and the solution proved, by years of service, to be the final triumph in tire-making.

The Dayton Airless Tire

Constructed scientifically—all element of chance is eliminated. A jagged rock, a fence-rail spike, or even a bullet cannot for a moment stop a Dayton Airless tire. For these tires do not depend on treacherous air. They are absolutely air-free—and the inner column-like supports of "cushiony" rubber piers alternating with free air spaces carry you along with wonderfully easy "give" and resiliency—but without the tossing rebound of pneumatics.



The Proof of This Airless Tire Triumph

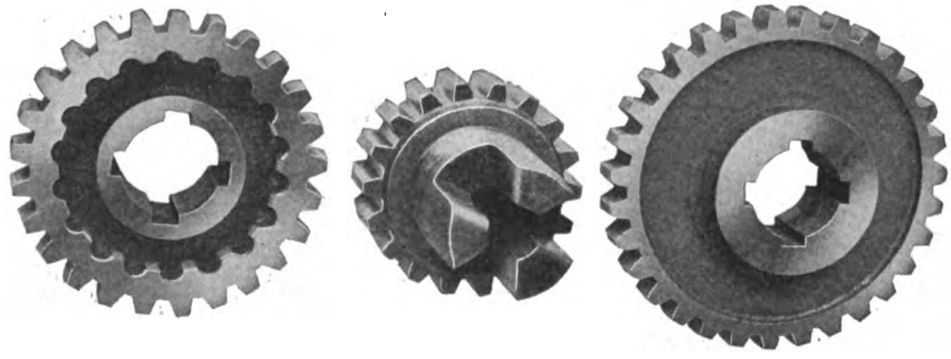
is yours if you will write for it. A little book—"The Air-Free-Care-Free Tire"—answers clearly your every question and gives all the facts in less than ten minutes' reading. Write for it today and find how you can more than double your tire wearing-service, make every moment of auto riding a moment of care-free pleasure and save all tire repair expense.

Dealers: Dayton Airless Local Agencies are money-makers for live managers. You want this business in your territory. Write us today for full particulars of our Dealer Proposition.

THE DAYTON RUBBER MANUFACTURING COMPANY

105 Kiser Street **Dayton, Ohio**

C. J. CROSS & CO., Eastern Agents, 1878 Broadway, New York City.
CHAS. P. JAEGER, Chicago Representative, 2123 Michigan Avenue, Chicago, Ill.
THE DAYTON AUTO EQUIPMENT CO., Central Ohio Representatives, 5 East Second Street, Dayton, O.
J. L. DULIN, Indianapolis Representative, 404 N. Capital Ave., Indianapolis, Ind.
E. LINGE, Kansas Representative, 123 West 5th St., Topeka, Kansas.
MERIDIAN SALES CO., Maryland, Virginia and District of Columbia Representatives, 729 15th St., Washington, D. C.
L. P. HORNBERGER, Pacific Coast Representative, Alaska Bldg., Seattle, Washington.
COX & SORENSON, Oregon Representatives, 719 Chamber of Commerce Bldg., Portland, Ore.



GRANT-LEES GEARS

A man can follow two paths. 1st—Quantity; 2nd—Quality.

The path of quality perhaps is not so profitable at the start but in the long run it is more profitable than the quantity road.

The gear quality of GRANT-LEES GEARS is very satisfactory to our customers.

THE GRANT-LEES MACHINE COMPANY, Cleveland, Ohio

Pioneer Helical Gear Makers in America

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EXPERIENCE - SHELDON - RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL
"Made in the Largest Axle Factory in the World"

Axle Talk—No. I

SHELDON axles take precedence in the commercial car field in quantity of production—at least seventy-five per cent of the trucks on the market being SHELDON EQUIPPED.

If "quality" were not inherent, then the quantity output would necessarily be much smaller than it is.

A cheap axle is a mighty poor investment for the car manufacturer—and a mighty poor advertisement for the concern that makes it.

In a nut-shell, then, it stands that truck manufacturers base a very large percentage of car efficiency on axles and springs—they must use the best or take long chances.

You can safely judge SHELDON axles by good design, experience, the manufacturer and responsibility.

We will explain in later advertising why these factors have made the name SHELDON synonymous with quality production.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

The TUTO Now Dominates the Field

A LITTLE more than a year ago the TUTO Horn was a stranger in the automobile accessory field. But the principle upon which it was constructed was right. Its universal adoption therefore, was only a matter of a few months of exploitation.

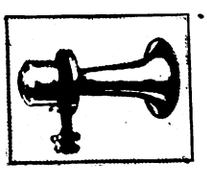
¶ The TUTO Horn is now recognized by automobile makers, dealers and owners alike as the only logical electric warning signal manufactured in this or any other country at any price.

¶ Today the TUTO Horn is included in standard equipment by many of the largest car manufacturers, and more makers are being constantly added to the list.

¶ The TUTO Horn stands supreme as a warning signal because it alone fully meets present day traffic requirements. No other horn gives two different notes with the same horn, push button, cord and battery.

¶ The low note for general service purposes, and the loud note for emergencies are both produced by pressure on the push button. This is located on the steering wheel right under the thumb of the driver whose hands and feet are free to operate the car in any emergency. The exclusive two-tone feature is fully protected by patents.

¶ The TUTO Horn takes the place of the inefficient bulb horn and the loud single tone electric horn which were included in standard equipment by some car manufacturers before the TUTO Horn appeared on the market. Therefore, it is the least expensive and car owners and makers have not been slow to realize this fact, which probably accounts for the astonishing increase in the demand for TUTO horns.

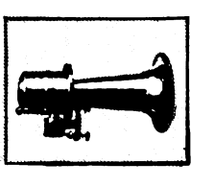


TUTO Horn, $25.00

The Dean Electric Co.

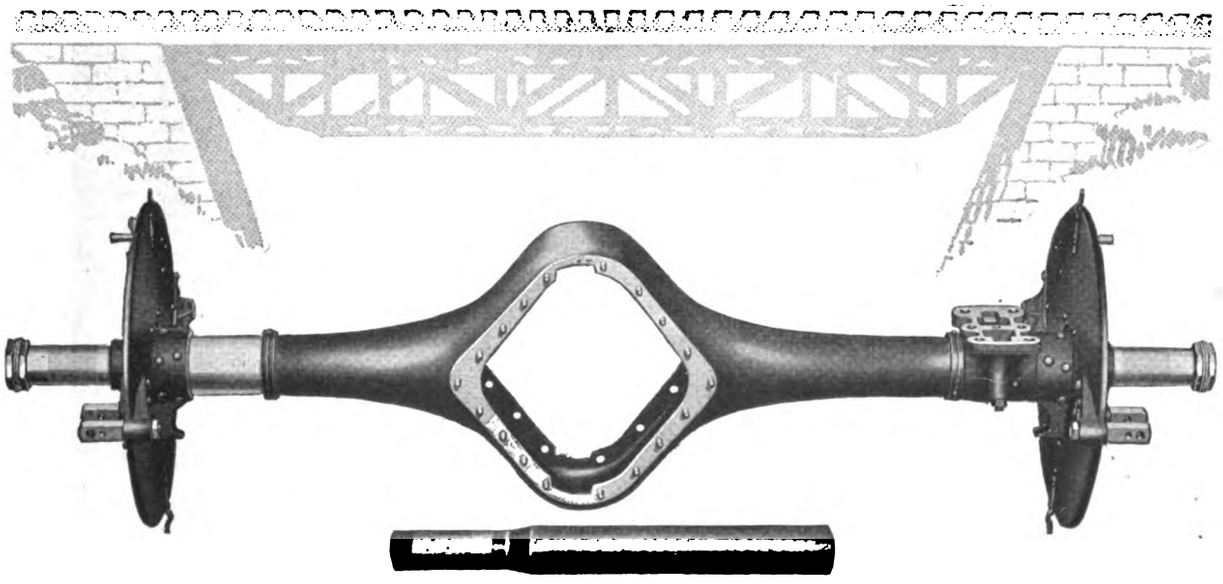
260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

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The Timken-Detroit Housing is built like a bridge

The weight of car and load presses down on the spring-seats just as the weight of bridge and train presses down on the girder.

The supports are the wheels at the ends of the housing—they are like the masonry at the ends of the bridge.

The housing is shaped like the truss of a bridge and the purpose of the shape is the same—to combine utmost strength and rigidity with the least possible weight. See how this is done in the Timken Housing.

First it is pressed steel—all one piece. Its central portion is shaped for greatest strength.

From the ends clear through to the central opening it is reinforced by a seamless steel tube riveted to the housing itself.

The spiders at the end are riveted through both housing and tube.

It is the Timken policy of extra strength and extra safety in every detail of construction that gives Timken-Detroit Axles their wide favorable reputation.

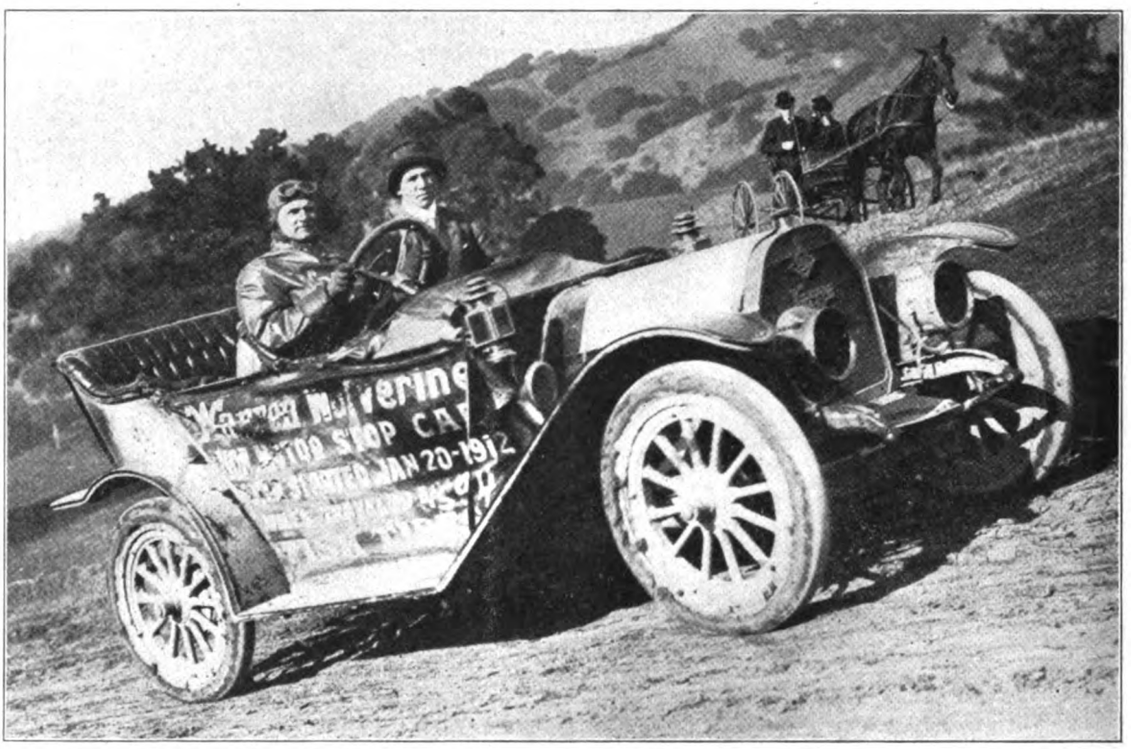
The Timken-Detroit Axle Company

Detroit, Michigan, U.S.A.

10

The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings

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Fisk Tires
Heavy Car Type

THE non-stop run of the Warren Car at Oakland, Cal., in which 17,800 miles were covered in 49 days is a remarkable proof of the wonderful efficiency of Fisk Tires. During this great distance only seven casings were used. At the finish the original Fisk equipment was still on the car and six of the tires were later employed on an agency tour of the Warren Company covering an extensive territory in Northern California. At that time it was estimated that each casing had given at least 10,000 miles of service.

On April 24th the Contest Board of the American Automobile Association accepted as an official non-stop record 12,404 9-10 miles of the distance, or that traveled from February 4th to March 9th. The tire mileage, however, is of course the entire distance traveled by the car without reference to motor stops.

Fisk Heavy Car Type Tires Are Sold by All Prominent Dealers

THE FISK RUBBER COMPANY

Department 23 *Direct Factory Branches in 35 Cities* **Chicopee Falls, Mass.**

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Get in the Band Wagon at the HEAD

It pays to tie up to a SUCCESS.

The DISCO Self Starter is the acknowledged LEADER.

It is here to STAY—a well established business—a COMMERCIAL proposition—a selling force and a profit maker for automobile makers and dealers alike.

There are FIFTEEN DISCO Branches in leading cities and dealers being added everywhere—daily. Do YOU know what we can offer you? Do you know the trade that is waiting for you.

The DISCO is selling MORE CARS for manufacturers who equip with it. There are THIRTY-SIX big, live manufacturers already boosting the DISCO because it boosts the sale of their cars.

The DISCO is selling more cars for dealers who handle cars that start with the DISCO. Many others are writing to their makers to "be sure and get that DISCO Starter for us."

The DISCO is making money for our agents who are installing it on cars that would otherwise be out of date. The DISCO sells readily because it is now known to 30,000 motorists who use it—and to their friends who want it.

To the manufacturer—to the trade—to the public it is

DISCO

THE Self Starter

The procession is well started. There are a few choice seats left in front. Don't trail along behind. Get in—get your share of the business DISCO is creating. WRITE OR WIRE at once for a proposition. You only lose by delay. The height of the season is at hand. SEND THAT INQUIRY NOW.

IGNITION STARTER COMPANY

Largest Manufacturers of Self Starters in the World

715 Dodge Building Detroit, Michigan

Eastern Distributors:

THE ARISTOS COMPANY, 250 West Fifty-Fourth Street, New York City

The DISCO Lighter—

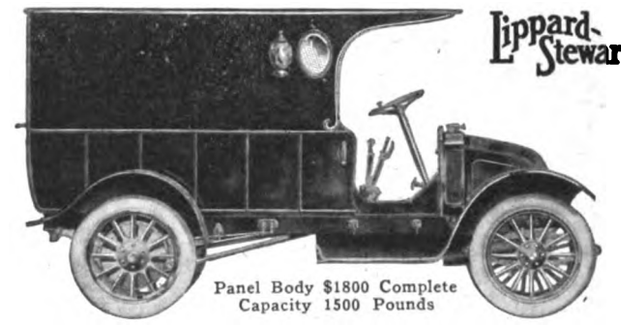
A New Twin Motor Comfort

The DISCO Lighter lights gas headlights, turns them down, or turns them out, all from the seat. Turn on the gas with the handle ON THE DASH, then simply press a button and your lights are lighted. Complete with special coil, special burners, all wiring and tubing, and complete instructions ready to install, $15.

NOTE THIS: Gas can't "blow" or flow unused.

Like the DISCO Starter, it is perfectly simple and simply perfect.

WRITE TODAY FOR WHOLESALE PRICES AND TERMS.



Panel Body $1800 Complete
Capacity 1500 Pounds

More Strong Selling Points on Lippard-Stewart Delivery Cars

In our last advertisement we discussed (1) the economies of the small motor with large gear reduction; (2) the elimination of unnecessary parts; (3) the accessibility of all parts on the Lippard-Stewart. Following are some of the additional advantages of this remarkable delivery car.

Left-Hand Steering—With the gear-shifting and brake levers in the center and the steering post at the left of the car, the driver can enter or leave the Lippard-Stewart from either side.

This saves time and is a great convenience in making deliveries. It permits the driver to alight on the side-walk instead of in the mud.

It also gives him a better view of passing vehicles and lessens the chance of accidents.

Improved Spring Suspension—Lippard-Stewart spring suspension lessens road shocks and reduces vibration—the most destructive factor in the operation of a motor vehicle. The more completely the road shocks can be absorbed by the springs, the longer the mechanism will last and the less will be the cost for repairs and for tire renewals.

Full elliptic front springs on the Lippard-Stewart have twice the shock-absorbing qualities of ordinary semi-elliptic springs. At the rear an ingenious combination of a long semi-elliptic with a coil spring makes the car ride almost as easily empty as when loaded.

Mechanical Excellence—All of the mechanical features of the Lippard-Stewart are of well-known, recognized excellence. The same motor has been used for more than two years in the hardest kind of taxicab service. The transmission is of standard type, strong enough for a 40 h. p. motor instead of the 22 h. p. Lippard-Stewart engine.

The clutch is of the multiple disc type used on the highest grade cars. The axles are of Timken make, specially built for the Lippard-Stewart. Wheels are of the heavy artillery type, with thick, sturdy spokes.

Ignition is furnished by a Bosch magneto, the recognized standard of the automobile world. And so all through—there is not a single mechanical feature whose worth has not been thoroughly proved.

Handsome Lines — Beautiful Finish—Wherever seen, Lippard-Stewart cars attract attention by reason of their handsome design. The graceful French type of hood; strong, substantial, sweeping fenders; big wheels and beautiful bodies—appeal to everyone. The Lippard-Stewart car is a constant advertisement for the progressive merchant who owns one.

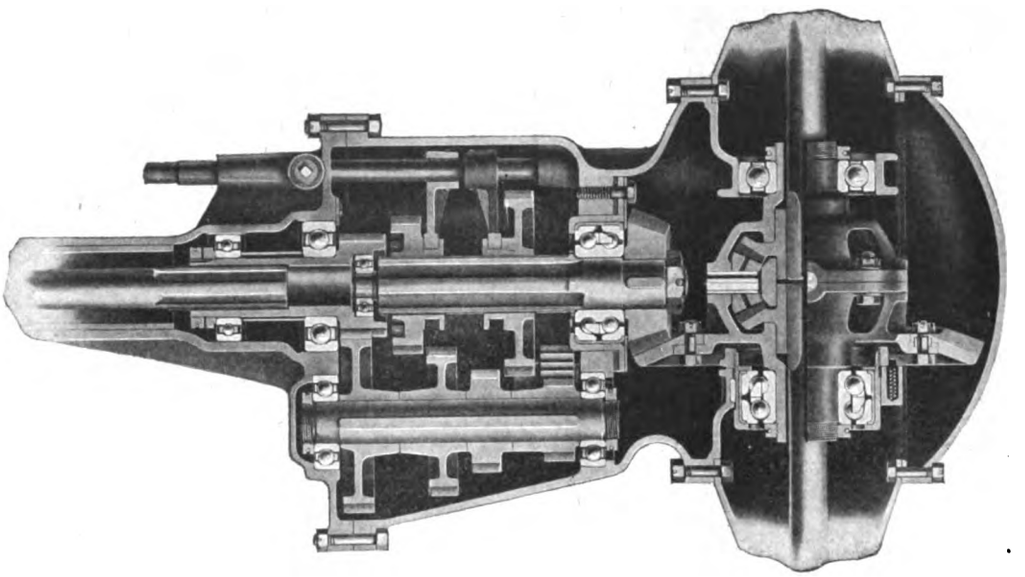
These are only a few of the many strong selling points of the Lippard-Stewart—features which appeal to the customer and which make the car a good selling proposition for the dealer.

Write for our catalog and further information about the money-making possibilities of this car. Excellent territories are still open, and we are always glad to get in touch with live dealers. We have the facilities to make prompt deliveries.

LIPPARD-STEWART MOTOR CAR COMPANY

Buffalo, N. Y.

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American Made FOR American Trade

New Departure GUARANTEED Ball Bearings

In Sixty Per Cent. of American Cars

SUPERIOR FOR THE TRANSMISSION: The success of New Departure Double Row ball bearings in resisting excessive radial loads and thrust stresses is demonstrated in the fact that this bearing is more commonly used than any other in the transmission back of the bevel pinion. It does away with the cumbersome thrust washer, complicated and expensive mounting and gives maximum efficiency and durability.

NUMEROUS ADVANTAGES IN THE DIFFERENTIAL: The use of the New Departure Double Row on the side of the differential insures simple, economical, ample provision for carrying the considerable thrust loads from the ring gear, fixes the working relation of the parts and prevents "slapping" of the gears. These are important advantages.

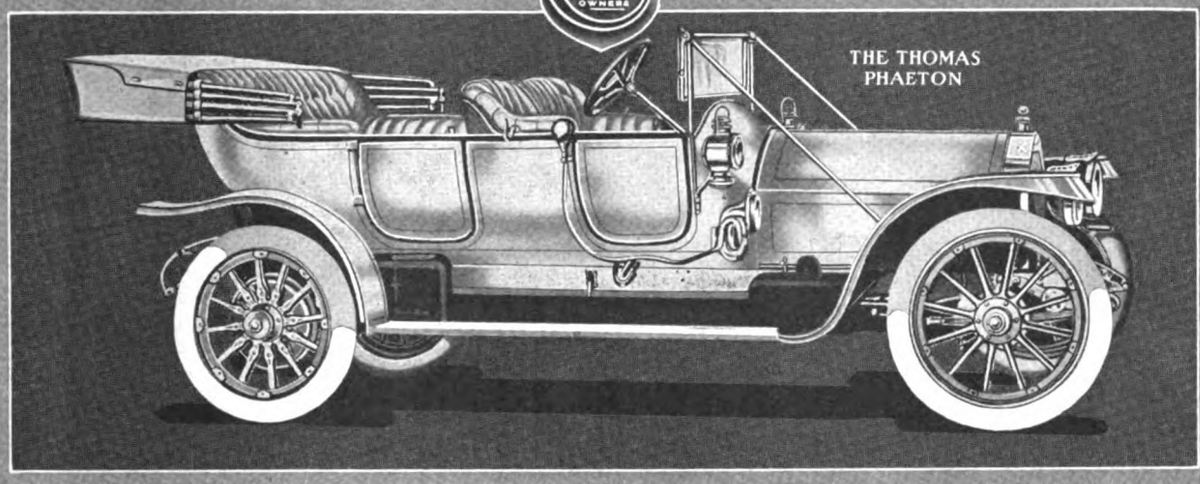
New Departure Single Row Ball Bearings are employed in the construction illustrated above, to care for radial loads only. This bearing has no superior; is absolutely guaranteed for strength of material, quality of workmanship and accuracy of finish.

CATALOG ON REQUEST—HIGHLY SPECIALIZED ENGINERRING INFORMATION ON YOUR BEARING PROBLEMS FOR THE ASKING

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.

Western Branch—1016-17 Ford Building, Detroit, Mich.

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THE COMFORTABLE THOMAS

With its mechanical and structural features the efficiency of which is easily proven by demonstration, the 1912 Thomas marks an epoch in *automobile riding comfort.*

The eleven inch upholstering, the three quarter elliptic springs, the secondary springs, the shock absorbers and recoil straps give a degree of *tonneau comfort,* especially in touring, not yet attained by any other American or foreign car.

The underslung gasoline and oil tanks give an extremely low center of gravity causing the car to hold the road better at high speeds and on sharp turns and further enhance the *physical comfort* of the passengers.

The sturdy Thomas construction, the extra large brakes, the safety loops and the wonderfully strong yet easily controlled steering mechanism give ample assurance of safety and *mental comfort* to both driver and passengers.

FOUR STYLES OF OPEN BODIES—TOURING CAR, PHAETON, SURREY AND RUNABOUT, PRICE $4,000 FOR EACH TYPE.

Our Catalog—"The Story of the Thomas" awaits your request.

E. R. THOMAS MOTOR CAR COMPANY, DEPT.F. BUFFALO

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Overland

PRICE is the pivotal point in any automobile transaction. A man expects quality although his better sense may tell him he is taking a long chance at the price.

Our Model 60 Overland sells at $1200.

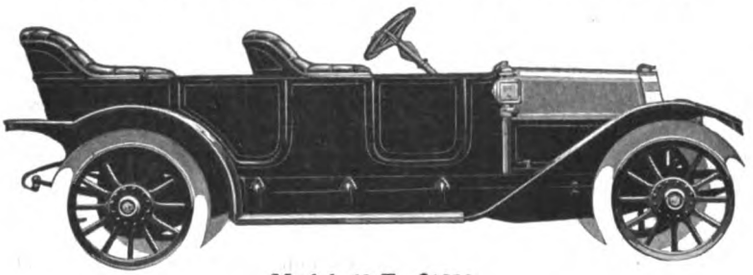
We want to thoroughly imbue you with the confidence that this Model 60 is sold at a lower figure than any similar car, but not at a price which jeopardizes the value—a price which might make quality—a doubtful proposition.

Only a duplicate of the Overland factory could produce a car at $1200 of similar capacity, power, silence, speed and comfort. The Overland plants have no duplicate in size or efficiency.

Model 60 is the car you should investigate. It will prevent you paying $1500 for the same value.

Write for book I-45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, May 9, 1912. No. 7

METZGER AFFAIRS LOOMING LARGE

"Big Things" Will Follow Smith's Move, But Admissions End There—Flanders and the Dodges Mentioned.

There is "something doing" in the Metzger Motor Car Co., of Detroit, and the "doings" are of magnitude, but they are so closely guarded that little more than an inkling of their nature has been permitted to escape. The principal outward and visible evidence of the bigger happenings which are to come is represented by the fact that Paul Smith, sales manager for the Studebaker Corporation, has resigned that office to assume a similar position with the Metzger company, and with the added title, first vice-president. Frank Smith, Paul's chief assistant in the Studebaker establishment, becomes Paul's assistant in the Metzger company.

Reports were afloat in Detroit early last week that Paul Smith was about to make such a change, but on Wednesday, when the question was squarely put to him by a Motor World man, he denied all intentions of the sort. The following day official announcement of his appointment was made by President B. F. Everitt, of the Metzger company, who plainly intimated that it was but the first of a series of other surprising moves, and added that Smith's entry into Metzger affairs carries with it the purchase of a large interest by himself and "certain associates," whose identity was withheld but who, he hinted, were Indianapolis capitalists who had been life-long friends of Smith, who hails from that city.

Although neither Mr. Everitt nor Mr. Metzger could be induced to give more definite information, reports persist that Smith's mysterious associates are none other than Walter E. Flanders and men with whom he is identified. Paul Smith himself is one of Flanders's personal proteges and their relations are so close that he has been almost a reflection of Flanders in all things.

Everitt, Metzger and Flanders were originally associated in the E-M-F company before it was purchased by the Studebakers, and when Mr. Metzger was asked whether the three "originals" were likely to be together again he refused either to confirm or deny the suggestion designed to draw him out in that form. He added that for the present Smith represents only himself.

From other sources, a report has emanated that Dodge Bros., who built the Ford engines and who are large stockholders in the Ford Motor Co., have disposed of their business and their holdings to Henry Ford for a sum approximating $5,000,000, and that they have linked with the Flanders interests and are probably the men who are actuating some of the moves in the Metzger company and who will bring into it such a large accession of capital that "doings" on a prodigous scale shortly will come to pass. Neither Henry Ford, nor the Dodge brothers could be reached and James Couzens, secretary and treasurer of the Ford company, declined to say anything, one way or the other. It is known that of late Flanders and the Dodges have been mingling freely and, apparently, the report grows out of that fact, for a man in position to know states that the Messrs. Dodge retain their Ford stock and are not likely to let go of such a good thing.

Fire Destroys Thousands of Tires.

Tires to the estimated value of $500,000 were destroyed on Tuesday afternoon last, 7th inst., by fire which practically wiped out one of the storage warehouses of the Revere Rubber Co., in Providence, R. I. The cause of the fire is a mystery. It proved an uncommonly stubborn one, which resisted the fire-fighters for more than four hours. It was discovered in a pile of rubbish and spread so rapidly that first efforts to extinguish it by hand extinguishers proved vain. One fireman was fatally injured and four others seriously hurt during the course of the conflagration. The Revere Rubber Co. is a part of the United States Tire Co. and officials of the latter state that the destruction of the fire will cause no delay in making deliveries.

CARLSON PATENT IS SUSTAINED

Maxwell-Briscoe Loses Its Appeal and Long Fight Ends—Involves Cover Plate For Twin Engines.

After a lengthy legal battle in the United States courts over alleged infringement of the Carlson patent, No. 797,555, issued August 2, 1905, and covering a removable cover plate in combination with certain other mechanism as applied to opposed cylinder engines, the decision of the lower courts upholding the claims of the Carlson Motor & Truck Co. against the Maxwell-Briscoe Motor Co. last week was affirmed by the United States Court of Appeals for the Second District. No damages were asked nor were any granted, the action hinging on whether or not the Maxwell-Briscoe Motor Co. had infringed the Carlson patent in the engine used in the two-cylinder pleasure cars which it once manufactured.

The defense contended that Carlson's claim was void because anticipated by previous patents and devices, and, if limited so as to avoid the prior art the Maxwell motor did not infringe. In upholding the validity of the Carlson patent the court said: "The invention was not generic; it related only to an improvement in existing structures, but was clearly an advance in the art, which, in view of the testimony as to its efficiency and popularity, required inventive rather than mechanical skill. The patentable feature of Carlson's contribution to the art was the readily removable cover plate with its moving parts."

Other patents which were introduced as being prior to Carlson's were notably those of Hiram Percy Maxim, Walrath, Duryea and others, whose mechanisms were slightly similar to Carlson's. In upholding Carlson's claims, however, the court held that Charles A. Carlson, the grantee, was a true inventor and beneficiary of the art of motor building and therefore is entitled to protection.

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"If it (the Carlson device) be no better than the structure on which the defendant relies," said the court, "it can use this structure with impunity so far as the complainant is concerned. If, on the other hand, Carlson has made an invention, even though it be of minor importance, he is entitled to protection.

"It is obvious that the improvement covered by the claim is simple," the court continued. "Prior to Carlson's invention, in order to get at the bearings of the connecting rods and crankshaft it was necessary to take the engine apart, remove the camshaft and followers, and, after the bearings had been adjusted, to replace and readjust the parts. All this took time and money. A quick, simple, inexpensive adjustment was not possible prior to Carlson's contribution to the art. Since then it is easily accessible by the simple device of mounting the shaft and followers in the cover of the crankshaft so that when the cover is removed the bearings are accessible. The difficulty of doing this work without disassembling the engine in prior types of opposed cylinder engines was a serious drawback to their efficiency."

Referring to a patent granted to Hiram Percy Maxim for an engine known as the "Mark XLIII," and which had a similar device for a single-cylinder engine, the court ruled that while Maxim's engine was completed in January, 1904, prior to Carlson's application for a patent, it was subsequent to the reduction of Carlson's device to practice. Emphasis also was laid on the fact that the Maxim mechanism dealt only with single-cylinder engines, while Carlson's applied to multi-cylinder motors. In reference to Duryea's patent, which was granted June 14, 1898, the court ruled that the device carried with it more than did the Carlson device and was in effect quite different.

In its simplest aspect, the Carlson device is a cover plate to be fastened to the top of the crankcase of an opposed-cylinder motor by means of half a dozen bolts. The plate carries bearings in which are mounted the camshaft which is driven by a gear at one end in mesh with a gear on the crankshaft. It also carries the cam followers so that the removal of the plate brings away at once camshaft, camshaft gear and followers.

While the suit was hard-fought, the effect of the decision will not be far-reaching, for with the exception of the Maxwell-Briscoe Co., whose engines now are constructed under what are known as the Dahl patents, and one or two others, the production of twin-cylinder opposed pleasure car engines has ceased. It is in the field occupied by the light commercial vehicle that the two-cylinder opposed motor is in greatest vogue, though even here the tendency seems to be toward the four-cylinder vertical motor. Whether Carlson, therefore, ever will realize greatly on his patent is a matter for speculation. At present he has a commercial vehicle company in Philadelphia.

FINED FOR "TECHNICAL CONTEMPT"

Weed Hales Atlas to Court For Selling Tire Chains—Despite Restraining Order —Explanation Modified Penalty.

Charged by the Weed Chain Tire Grip Co., of New York, with having violated a restraining order, the Atlas Chain Co., of Brooklyn, N. Y., was fined $50 for contempt of court by Judge Lacombe in the United States District Court for the Southern District of New York on Tuesday last, 7th inst.

The action grew out of the litigation involving the Parsons patent, the restraining order against the Atlas company having been issued in January last. While the allegations of Duncan & Duncan, the attorneys for the Weed company, charge that the Atlas people had made nine sales of grips in February, amounting to $150, as a defense Frederick McCormack, president of the defendant company, pleaded that he misread the order of the court and did not knowingly and willingly violate it, which explanation Judge Lacombe held to be not improbable. He therefore dismissed the two main charges but imposed the fine for seven subsequent instances in which an employee disobeyed instructions and thereby committed technical contempt, for which his employer was held responsible. The fine of $50 was ordered paid to the complainants.

When the contempt proceedings were disposed of, the Weed counsel brought out that the Atlas company had announced that it would cease selling its alleged infringing grips and instead would market a "tied" type, and asked that the court take action in the matter. The defendant's attorney promised, however, that nothing of the sort would be done while the restraining order is in force.

Handley Enters Enlarged Marion Company.

Following an increase of its capital stock from $100,000 to $1,125,000, the Marion Motor Car Co., of Indianapolis, which is one of the several possessions of John N. Willys, of Toledo, Ohio, J. I. Handley, president of the American Motors Co., also of Indianapolis, maker of the American underslung car, has entered into its affairs and assumed its active management. It is stated that the major portion of the new stock has been taken by Handley and Willys, but just where the control lies is not made plain. It is declared, however, that there is absolutely no connection or affiliation between the Marion and Willys-Overland companies, or the American Motors Co., of which Handley retains the presidency. The Marion company, to quote the official statement, "will be an absolutely independent and self-contained organization. Of the capitalization, $625,000 is represented by common stock and $500,000 by preferred. It is the intention to greatly enlarge the Marion business, plans already being in hand for the construction of an addition to the present plant, which will continue the manufacture of Marion touring cars at $1,350 and $1,750, respectively.

Yellow Taxicab Swallows Connecticut.

The Yellow Taxicab Co., which was incorporated last month under New York laws, with $5,000,000 capital, and which acquired the taxicab business of the New York Transportation Co., has also absorbed the Connecticut Co., which previously operated the "yellow" cabs in New York City. For the time being, at least, the officers of the Connecticut company will serve as officials for the Yellow Taxicab Co. They are as follows: President, A. F. Rockwell, who is also the head of the New Departure Mfg. Co., of Bristol, Conn.; secretary and general manager, P. J. Holdsworth; treasurer, C. T. Treadway; assistant treasurer, Jesse M. Judson. The new company is now taking possession of the New York Transportation Co.'s huge garage building, at 8th avenue and 49th street, and is planning further extensions, the nature of which will not be disclosed for several weeks.

Indianans Arrest Colorado Promoter.

Threats which have been hanging over his head for a year or more, this week resulted in the arrest of W. H. Hostetter, at the instance of several citizens of New Castle, Ind., who allege that Hostetter induced them to subscribe $30,000 for stock in the Universal Motor Co. on representations that a factory would be located in New Castle. As the factory is still a castle in the air, the complainants charge Hostetter with obtaining money under false pretenses.

What there was of the Universal Motor Co. had its beginning in Denver, Colo., where it is stated at least one truck, involving radical features, was constructed. As the project did not greatly prosper in the Rocky Mountain climate, Hostetter worked further East, visiting New Castle, Cincinnati, and a number of other cities.

Rainey Sues for Himself and Owen.

Suit has been begun in New York by Roy A. Rainey to recover from the Jones Taximeter Co., of New York, loans aggregating $103,500, which were made between May, 1909, and September, 1910. Rainey claims he lent the defendant $61,500, of which only $9,750 has been repaid, and that Raymond M. Owen loaned the same amount and received only $9,750 in payment. Owen assigned his account to Rainey.

Detroit Makes Ready for "Six" Demand.

According to reports in Detroit, practically all of the many automobile manufacturers in that city either have a six-cylinder model in hand or in contemplation for the 1913 market. The Warren Motor Car Co. and the Hudson Motor Car Co. are two of those that are definitely known to have their "sixes" well advanced.

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PEERLESS'S IMPRESSIVE PROFITS

Its Bond Issue Brings Out Its Assets and Earnings—Yearly Average Far in Excess of $600,000.

Offerings for public subscription of the unsold portion of the Peerless Motor Car Co.'s recent issue of first mortgage 6 per cent. bonds have served to disclose some hitherto unknown facts and figures relating to that Cleveland company's earnings and other inside affairs. They show that for the period of sixty-five months, from August 1, 1907, to January 1, 1912, the company's sales averaged $3,964,217 per annum, its net profits for the same period being $651,467 per annum, the figures, as attested by certified public accountants, being as follows:

Total sales	$21,472,842.46	$3,964,217.06
Net earnings	4,464,820.56	824,274.58
Depreciation	$ 652,859.33	$ 120,527.88
Other deductions	283,179.17	52,279.24
Total deductions	$ 936,038.50	$ 172,807.12
Net profits	$ 3,528,782.06	$ 651,467.46

The fixed assets, covered by the mortgage, as computed by the appraisers, are as follows:

Real estate, consisting of 20.8 acres of land, of which 6.2 are now owned in fee, and 14.6 under lease and which the company is required to purchase	$384,892.50
Eighteen buildings, of brick, concrete and steel	967,084.03
Power equipment, fire protection and machinery	968,254.66
Total	$2,320,231.19

In arriving at these figures, the appraisers have deducted from their reproduction cost, charges for depreciation on the buildings and machinery of $385,464.34.

The balance sheet of the company, as of January 1st, 1912, shows total quick assets of $2,639,196.20, and the deed of trust securing this bond issue requires the company to maintain its net quick assets at an amount at least equal to the total amount of bonds outstanding. It is provided that the quick assets entering into this calculation shall consist only of cash on hand, accounts receivable, bills receivable, and inventory at 55 per cent. of cost. The company is required to submit to the trustee a quarterly statement of its current assets and a complete annual audit; and the trustee is given the further right to call for a full statement at any time. The application of the proceeds of the $1,100,000 bond issue, and of the $300,000 additional stock which has just been subscribed by the present stockholders, reduces the company's current liabilities to a negligible amount.

As further security for the bond issue, the Peerless parent company has deposited with the trustee, the Superior Savings & Trust Co., of Cleveland, the entire capital stock of the three subsidiary Peerless companies which, although separately incorporated, constitute factory branches. There also has been deposited with the trustee, for the same purpose, the entire stock issue of the Doan Realty Co., which owns the land and palatial nine-story building at 1760 Broadway, which is used for the New York branch, which property is carried on the books of the company at exact cost, $747,966.08, which is subject to a mortgage for $400,000, held by the Equitable Life Assurance Society of New York, leaving an equity of $347,000.

The bonds, which mature serially each year until April 1, 1924, are redeemable at the option of the company at 102 and interest.

The company has an authorized capital of $3,000,000, of which $1,502,400 is outstanding. Its incumbent officers are as follows: L. H. Kittredge, president; E. H. Parkhurst, vice-president; Geo. B. Siddall, secretary and general counsel; F. I. Harding, treasurer. Directors: Samuel Scovil, A. B. McNairy, L. H. Treadway, Corliss E. Sullivan, W. H. Staring and the officers.

Weed Brings Adjuster Patent to Bear.

Not content with proceeding against makers and sellers of both creeping and non-creeping chain tire grips, as infringements of the Parsons patent, the Weed Chain Tire Grip Co. has brought still another patent to bear, No. 953,673, known as the Weed adjuster patent. Alleging its infringement, suit has been brought in the United States District Court for the Southern District of New York against Charles Wieland and the 35% Automobile Supply Co., of New York, who, respectively, manufacture and sell a spring tire chain grip, which is a combination of four spiral springs which are attached to the side chains of the grip and which extend inwardly toward the hub and thus hold the grips against the tire.

Hooke Made Gramm's General Manager.

Harvey S. Hooke has been appointed general manager for the Gramm Motor Truck Co., of Lima, O., the appointment being made by John N. Willys, of the Willys-Overland Co., who recently acquired control and assumed the presidency of the Gramm company. Hooke has been identified with the Willys interests as manager of the Marion Motor Car Co., of Indianapolis, which is one of Willys's properties. Hooke will be practically in full control of the Gramm plant, as the executive and sales offices will be retained in Lima and not removed to Toledo, as at first reported.

Electric Vehicle Section for Chicago.

At the Chicago show, next January, a distinct section for electric vehicles will be instituted. It will be laid out in the First Regiment Armory, and the allotment of space will be made by, or under the supervision of the electric vehicle committee of the N. A. A. M.

COURT CONVINCED AGAINST HIS WILL

Sustains Sager Bumper Patent But Admits Precedent Swayed Him—Kindred Devices That Caused His Hesitation.

Admitting that he reached his decision with great hesitation, Judge Hough, in the United States District Court for the Southern District of New York, on Friday last, 3rd inst., upheld the Sager bumper patent, No. 885,181, in the suit of J. H. Sager Co., of Rochester, N. Y., against the Emil Grossman Co., of New York City.

The Grossman bumper, styled the Swivelaction, was made under the McGregor patent, No. 958,420, which is the property of the United States Auto Bumper Co., of Chicago, which produced the Swivelaction bumper marketed by Grossman, and which assumed the defense in the action just decided.

Judge Hough's hesitation in finding for the defendant was due to his belief that the Sager device was an adaptation of a railway bumper and as such did not constitute true invention. After interestingly arguing with himself, however, the learned justice decided the precedent established by justices as wise or wiser than himself should prevail, and it was consideration of this precedent that led him to hold that "the defendant has not shown enough to upset the presumption of invention attaching to the patent."

Judge Hough's decision in full is as follows:

It is alleged that defendant by the manufacture and use of an automobile buffer made pursuant to the McGregor Patent No. 958,420, infringes Claims 6 and 7 of the patent in suit. These claims are as follows:

"6. In an automobile buffer, a horizontal buffer rod, lever means attached to said rod and pivoted to the frame of the automobile and connecting them in a line at an angle to the line of motion of the automobile from the pivotal axis to the point of attachment of said lever to said rod, and a spring put under stress by movement of the lever around its pivotal axis.

"7. In an automobile buffer, a horizontal buffer rod, lever means attached to said rod and pivoted to the frame of the automobile and connecting them in a line at an angle to the line of motion of the automobile from the pivotal axis to the point of attachment of said lever to said rod, a spring put under stress by movement of the lever around its pivotal axis, and a support for said spring, attached to said automobile and in convenient proximity to said lever."

The defences are invalidity and non-infringement. Before Sager's patent it is in evidence that the device of Harroun (Patent 873,544) obtained considerable vogue. Harroun's buffer consists of a bar extending across the front of the vehicle at a convenient height from the ground, supported on spring-controlled slides, which springs move under pressure horizontally only. Harroun's style of buffer bar is said to possess disadvantages when the line of impact or collision is not that of the spring-controlled slides. In untechnical language, if Harroun's bar is not hit straight it tends to cramp. Sager's bumper consists of a buffer rod extending across the automobile front mounted on a pair of spring-controlled levers, which levers are pivoted to the frame of the automobile and extend therefrom at such an angle

(Continued on Page 40.)

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ROSE'S ACTION PROVED BOOMERANG

Sought To Withdraw Complaints "Without Prejudice," But Defendants Objected. Two Suits, Therefore, Fall Through.

After having filed a suit in the United States Circuit Court for the Southern District of New York, charging infringement of its Never-Out lamp bracket patent, No. 883,973, in which the Lowe Motor Supplies Co. and the Cox Brass Mfg. Co., of New York, were made joint defendants, the Rose Mfg. Co., of Philadelphia, for some reason, sought to have its own complaint dismissed "without prejudice," which according to legal practice, would give the right to renew the action in some other form. Charles C. Gill, counsel for the Lowe company, opposed the motion, however, and so successfully that the complainant's motion to dismiss "without prejudice" its bill of complaint, was denied by Judge Holt on Tuesday last, 7th inst.; instead it was dismissed without reserve at the cost of the complainant, which means that it cannot be renewed. The attorney for the Cox Brass Co., however, took a different tack, and that suit will be prolonged and will require the taking of extensive testimony.

Another suit of the same character, brought by the Rose interests against Thomas Parker and the American Auto Supply Co., of New York, in which Counsellor Gill also appeared for the defendants, and in which the Rose company followed the leave-to-withdraw-without-prejudice policy, was also dismissed without reserve by Judge Holt on Tuesday last.

In its answer to the suit, which was filed last August, the Lowe Motor Supplies Co. at least, had entered not merely a general denial, but cited no less than 47 American patents which are claimed to ante-date the Rose patent. These alleged anticipations cover a period as widely separated as March 16, 1869, when C. H. Miller was granted patent No. 87,957 for a lamp bracket, and May 5 ,1907, when E. S. Gunn was granted patent No. 852,505 for a headlight. They cover all manner of devices, from lamp brackets to brackets for advertising signs, horns, desks and shaving glasses. Brackets employed by the makers of the Warner, Stewart and Jones speedometers, among a number of others, were also cited as anticipations.

Benz Bodies In Bankruptcy Suit.

Henry B. Singer, as trustee in bankruptcy of Rothschild & Co., has brought suit in the Supreme Court of New York County, against the Benz Auto Import Co. of New York City, to recover $1,012 which he claims is due the bankrupt firm for two automobile bodies it built on contract for the Benz company, and which the latter did not pay for. In answer the Benz company admits a contract but claims the bodies were delivered and paid for. The contracts are alleged to have been made in the fall of 1910. One body was priced at $1,.400, the other at $718. The plaintiff claims the bodies were not taken by the Benz company, that after the bankruptcy proceedings began the Benz company was notified that the bodies would be sold at public auction and that the Benz company would be held liable for the difference between the price received at auction and the contract price. This difference on the two bodies is held to be $613 and $399, the amounts sued for.

Engine Company To Reorganize.

Reorganization of the Continental Engine Co., of Chicago, which carries with it the acquirement of new capital and a factory in Dallas City, Ill., is expected to be consummated late this week. The Continental company, which is no relation to the Michigan company of that name, has offices at 1256 Michigan avenue, Chicago; and, according to John E. Pfeffer, whose name, as manager, is the only one appearing on its letterhead, it has been in existence since 1899. Among the new men who will enter the company are Charles Barney, at one time mechanical engineer for the Deering Harvester Co., and D. H. Mars, until recently sales manager for the Model Gas Engine Works, of Peru, Ind.

Roche Again Returns to His Batteries.

After an absence of several years, William Roche, who in the infancy of the automobile industry probably was the best known maker of dry batteries, has returned to that trade. He has organized the William Roche Electrical Co., of which he himself is president and M. G. Goldstein treasurer, and which is located at 80 Warren street, New York. Roche asserts that the new Standard dry cell which he now is producing is even better than the Roche dry cell of former years, which had a reputation that is not to be denied.

Horn Company Organized in Detroit.

The Maxeff Horn Co., of Detroit, which recently was incorporated under the laws of Michigan with $15,000 in capital stock, has completed its organization by the election of the following officers: Ard E. Richardson, of Saginaw, president; Charles Bernard Weadock, vice-president; Arthur Webster, secretary, and J. Robert Gill, manager, all of Detroit. The company will market a reed automobile horn of moderate price and high efficiency.

Lozier Discontinues Making of "Fours."

Confirming a report which had been current for several months, the Lozier Motor Co. early this week formally announced the abandonment of four-cylinder cars and its determination hereafter to build "sixes" exclusively. The fact that during the part year the Lozier "sixes" outsold the Lozier "four" in the proportion of 5 to 4, settled all doubts in the Lozier mind.

HENDERSON COMPANY COMPLETED

Carter, of Georgia, Assumes the Presidency—Other Officers and Working Staff Selected—New Car at $1,295.

L. Carter, of Jessup, Ga., was elected president of the Henderson Motor Car Co., of Indianapolis, which formally completed its organization on Monday last, 6th inst., when it was incorporated with $100,000 capital and when its first election was held. R. P. Henderson, the prime mover in the enterprise, was chosen vice-president. C. K. Share was elected treasurer, and L. S. French, secretary and advertising manager. In addition to the four officers, the board of directors consists of Chester S. Ricker, Charles P. Henderson and E. E. Rogers. Ricker will serve as chief engineer, and Charles A. Trask, former superintendent of the Cartercar Co., of Pontiac, Mich., will be factory manager. F. E. Wilson, former sales manager of the Marion Sales Co., will be sales manager of the new Henderson company. Although C. P. Henderson is on the board of directors, he will not be an active worker but will confine his efforts solely to the Cole Motor Car Co., of which he is the sales manager. L. Carter, president of the new Henderson company, is the largest stockholder in the Cole company, with the exception only of J. J. Cole.

The Henderson car which will be produced will sell for about $1295, and will be as attractive in design and mechanical features as it is in price. It probably will make its appearance in July next. The factory will be located in Indianapolis, or near enough to that city so that the general offices of the Henderson company may be maintained in the Hoosier capital.

United States Rubber Profits, $6,700,000.

The annual report of the United States Rubber Co., for the year ending March 31, 1912, which just has been issued, shows a surplus applicable to dividends of $5,376,306 as against $4,349,825 in 1911, and $5,535,163 for the year 1910. This amount is equal to 6 per cent. on the common stock, after making allowance for the first and second preferred issues, as against a balance of 2.20 per cent. for the 1911 year, and 7.84 per cent. for the 1910 year. Apart from this income the undivided share earnings of the Rubber Goods Manufacturing Co., the Canadian Consolidated Rubber Co. and the General Rubber Co., the stock of which is all owned by the United States Rubber Co., amounted to $1,335,024. Including this item, the net profit for the year shows a total of $6,711,331, against $5,661,991 the previous year, which would make aggregate net of 11.64 per cent. for the common stock. The big company's total sales amounted to $36,775,000 as against $40,888,000 for the year 1911.

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Cody, Wyo.—Cody Garage Co., under Wyoming laws, with $15,000 capital; to operate a garage.

Richmond, Mich.—Richmond Auto Co., under Michigan laws, with $5,000 capital; to deal in motor cars.

Placerville, Cal.—Inter-Urban Automobile Co., under California laws, with $100,000 capital; to deal in motor cars. Corporators—H. F. Hobson and others.

Albany, N. Y.—Motordom Publishing Co., under New York laws, with $50,000 capital. Corporators—A. J. Deer, Hornell; R. S. Ross and H. Martin, Albany.

Brooks, Mary E. Brooks, Charles W. McKee.

St. Joseph Mo.—Armstrong Auto Co., under Missouri laws, with $2,000 capital; to deal in automobiles. Corporators—J. M. Armstrong, L. M. Armstrong, A. B. Reichman.

Wilmington, Del.—U-Nit Motor Co., under Delaware laws, with $100,000 capital; to manufacture internal combustion motors. Corporators—Edwin C. Reed and others.

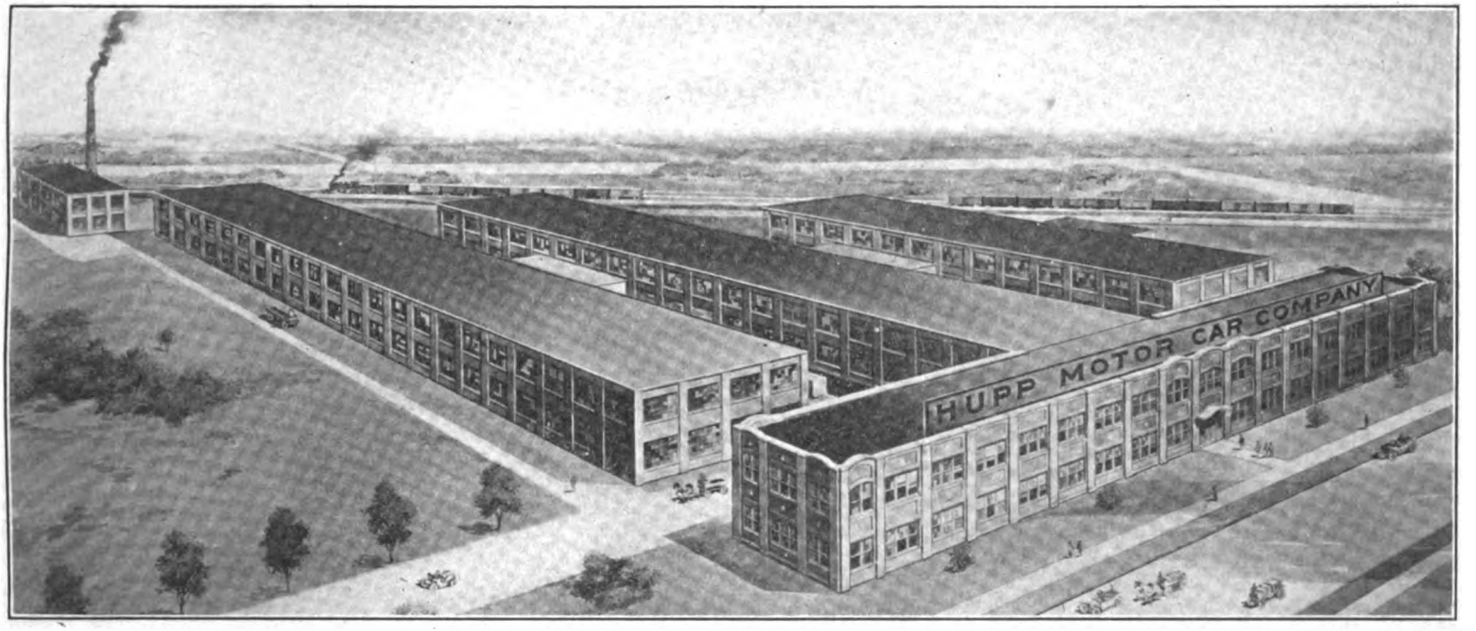
Chicago, Ill.—Pullman Motor Sales Co., under Illinois laws, with $2,500 capital; to

with $20,000 capital. Corporators—Daniel O. Fillmore, Charles E. S. Moir, Lucy M. Fillmore.

Boston, Mass.—Avis Engine Co., under Massachusetts laws, with $50,000 capital; to manufacture engines. Corporators—John H. Norton, Edward B. Robinson, E. Sargent Cox.

Chicago, Ill.—Standard Auto Equipment Co., under Illinois laws, with $1,000 capital; to rent automobiles. Corporators—Milton Lowenthal, Edward B. Friedlander, Joseph A. Netzel.

Malden, Mass.—Charles E. Hall & Sons,



HUPP MOTOR CAR COMPANY'S RECENTLY COMPLETED PLANT IN DETROIT, IN WHICH HUPMOBILES NOW ARE PRODUCED

Muncie, Ind.—Muncie Automobile Co. under Indiana laws, with $15,000 capital; to deal in motor cars. Corporators—M. T. Hanley, J. J. McInnis, F. A. Hanley.

Los Angeles, Cal.—Pathfinder Motor Co., under California laws, with $80,000 capital; to deal in motor cars. Corporators—I. N. Johnston, N. Abeel, Henry K. Norton.

Hoopeston, Ill.—Hoopeston Automobile Co., under Illinois laws, with $25,000 capital; to deal in motor cars. Corporators—W. N. Ferguson, F. W. Wallace, J. W. Norris.

Chicago, Ill.—Packer Auto Specialty Co., under Illinois laws, with $2,500 capital; to deal in motor car supplies. Corporators—William Bangs, Laird Bell, William C. Boyden.

Chicago, Ill.—Brooks Taxicab Co., under Illinois laws, with $2,500 capital; to operate taxicabs. Corporators—George W.

deal in motor cars. Corporators—Lawrence A. Capen, Charles Aaron, John W. Bissell.

Boston, Mass.—United Garage Co., under Massachusetts laws, with $15,000 capital; to operate a garage. Corporators—Jesse Good, James R. Jones, William F. Waters.

Waterbury, Conn.—Elton Garage Co., under Connecticut laws, with $5,000 capital; to operate a garage. Corporators—Almon C. Judd, E. Webster Judd and John R. Hughes.

Detroit, Mich.—Baker Electric Co., under Michigan laws, with $50,000 capital; to deal in motor cars. Corporators—J. Cadwell Walker, R. C. Norton, William C. Burnett.

Chelsea, Mass.—New York and Boston Autobus Co., under Massachusetts laws,

Inc., under Massachusetts laws, with $5,000 capital; to deal in motor cars. Corporators—Atherton N. Hunt, Robert J. Cram, Frank M. Sawtell.

Salt Lake City, Utah—Lark Automobile Stage Co., under Utah laws, with $3,200 capital; to operate an automobile stage line. Corporators—W. A. Kidney, Alfred Frank, L. J. Gilmer.

Louisville, Ky.—Louisville Lozier Co., under Kentucky laws, with $20,000 capital; to deal in motor cars. Corporators—Howard Lathrop, Herbert T. Martin, Robert Stewart, and others.

Winthrop, Minn.—Winthrop Motor Car Co., under Minnesota laws, with $25,000 capital; to deal in motor cars. Corporators—G. E. Larsen, George Schman, A. L. Olsen, F. J. Schisler.

Chicago, Ill.—Dolly Electric Specialty

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Co., under Illinois laws, with $9,000 capital; to deal in automobile supplies. Corporators—Edward W. Dolliver, William M. Pearl, William A. Fechtman.

Long Beach, Cal.—California Co-operative Motor Co., under California laws, with $150,000 capital; to deal in motor cars. Corporators—Joseph J. Mottell, W. H. Bennett, Stephen H. Underwood.

Chicago, Ill.—Bismarck Auto Livery Co., under Illinois laws, with $10,000 capital; to operate a garage and automobile livery business. Corporators—M. B. McConigle, James McCabe, Adolph George, Jr.

Wilmington, Del.—Never-Puncture Tube and Tire Co., under Delaware laws, with $1,500,000 capital; to manufacture automobile tires, etc. Corporators—E. E. McWhiney, W. J. Maloney, N. P. Coffin.

Newburgh, N. Y.—Auto Top and Dust Cover Co., under New York laws, with $5,000 capital; to manufacture automobile tops. Corporators — Charles Clapper, Robert E. Nixon, Elizabeth A. Caron.

Buffalo, N. Y.—Oldsmobile Co., of Buffalo, under New York laws, with $10,000 capital; to deal in motor cars. Corporators—W. J. Mead and R. N. Mosher, of Lansing, Mich., and L. G. Dodge, of Buffalo.

Augusta, Me.—Thirty-Five Per Cent. Automobile Co., under Maine laws, with $1,000 capital; to deal in motor supplies. Corporators—E. M. Levitt, Winthrop; M. M. Spinney, E. L. McLean, both of Augusta.

New York, N. Y.—B. F. Goodrich Co., under New York laws, with $45,000,000 capital; to manufacture rubber goods. Corporators—B. G. Work, C. B. Raymond, Akron, Ohio; D. M. Goodrich, New York City.

New York, N. Y.—L. A. W. Carbureter Co., under New York laws, with $100,000 capital; to manufacture carburetters. Corporators—N. Leinau, S. Heineman, New York City; H. A. Watkins, Cos Cob, Conn.

Wilmington, Del.—P. & A. Non-Metallic Oilless Bearing Co., under Delaware laws, with $50,000 capital; to manufacture bearings. Corporators—E. E. McWhiney, W. J. Maloney, N. P. Coffin, all of Wilmington.

Columbus, Ohio—Columbus Motordrome Co., under Ohio laws, with $20,000 capital; to erect and operate a motordrome. Corporators—William H. Snyder, George Baughem, Phillip A. Vogel, Charles H. Barr, and others.

Atlantic City, N. J.—Atlantic City Automobile Exposition Co., under New Jersey laws, with $25,000 capital; to promote automobile exhibitions. Corporators—Edward G. Harris, Reuben L. Babcock, Thomas B. Williams.

New York, N. Y.—D. MacWatty & Co., under New York laws, with $5,000 capital; to manufacture lubricants. Corporators—Duncan MacWatty, Hasbrouck Heights, N. J.; Herman P. Lowe, Bloomfield, N. J.; Herman P. Lowe, Bloomfield, N. J.; William J. Weir, 159 Underhill avenue, Brooklyn.

BUFFALO ELECTRIC'S SHOW-DOWN

Offers Preferred Stock to Public and Discloses Condition — Property Acquired, Average Earnings and Expectations.

Having completed its organization and taken over the Babcock Electric Carriage Co., the Buffalo Automobile Station Co., the Clark Motor Co. and the Buffalo Electric Carriage Co., the recently organized Buffalo Electric Vehicle Co. is offering for public subscription $50,000 of its preferred shares and, as an inducement to purchasers, is giving a 25 per cent. bonus of common stock with each preferred share. Payment at the rate of 40 per cent. in cash with each subscription, and the balance in installments of not over 20 per cent. is required.

Of the $300,000 in preferred shares which have been authorized, only $250,000 have been issued, and of the $700,000 common stock only $600,000 have been issued.

What is termed by the auditors the "initial balance sheet of the new company as it would appear after selling preferred stock at par and taking over the assets and debts of the several companies" discloses the following condition:

Assets.

Cash	$269,615.19
Notes and accounts receivable	15,553.20
Inventories	229,030.98
Inventoried land, buildings and equipment	144,110.87
Prepayments, etc.	6,290.42
Leases, patents, contracts and other assets	400,000.00
Common stock in treasury	40,000.00
	$1,099,600.66

Liabilities.

Preferred stock	$250,000.00
Common stock	600,000.00
Notes payable	117,748.69
Mortgages	25,000.00
Accounts payable	27,019.54
Reserve	79,832.43
	$1,099,600.66

The business of the Babcock Electric Carriage Co. and the Buffalo Automobile Station Co., for a period of six years, shows a total of $1,805,912.71. The net earnings, after deducting for depreciation, interest charges and bad debts, averaged $24,730 per annum. The tangible assets of the properties appraised amounted to $409,600 and the debts to $169,768.23.

With the present equipment, the company claims that an annual output equivalent to $1,250,000 can be manufactured, and that, on the basis of $1,000,000 sales, a profit of at least 15 per cent, can be earned, which will mean an annual average profit to the stockholders of $150,000. According to the way the company figures it, after deducting $17,500 for dividends on the preferred shares, there will be left $132,500, or about 20 per cent. per annum, applicable to dividends on the common stock.

While four companies were mentioned in the reports of the merger, only the Babcock Electric Carriage Co. and the Buffalo Automobile Station Co. are named in the auditors' certificate. Of the unnamed companies, the Buffalo Electric Carriage Co. is simply the name used by the Babcock people when they were first organized, the name and good will of which, however, were retained. The other company, the Clark Motor Co., produced a few trucks in a factory on Elmwood avenue, in Buffalo, but was not operating when taken over by the new company. Its chief possession appears to be the Van Wagoner patent, covering a motor suspension and transmission, a license under which was granted to the Woods Electric Vehicle Co.

Since Samuel J. Dark was elected president of the Buffalo Electric Carriage Co., and the other officers chosen, two weeks ago, ten additional directors have been named, all of them prominently identified with Buffalo banking institutions, or other commercial enterprises of note. They are as follows: Jacob Amos, Frank L. Pabst, Laurens Enos, Howard A. Forman, O. E. Foster, Henry D. Knox, Frederick F. Klinck, William H. Kinch, Harry T. Vars and Moses Shire.

Changes Among Prominent Tradesmen.

D. E. Whipple has been promoted to the management of the Anderson Electric Car Co.'s Chicago branch. Previously he was connected with the home office in Detroit.

Karl Probst has been appointed manager of the Norwalk Motor Car Co., of Charlestown, W. Va. Formerly he was manager of the Stone-Probst Axle Co., of Columbus, Ohio.

R. A. Weinhardt, formerly mechanical engineer for the Hener Motor Car Co., of Muskegon, Mich., has become connected with the Continental Motor Manufacturing Co., of the same city.

R. W. Leach, of Chicago, has been appointed manager of the Woods Electric Vehicle Co.'s branch in St. Louis. He succeeds H. C. Hensel, who temporarily was serving at that point but who will return to the Woods factory in Chicago.

E. F. Jackson, manager of the Detroit district for the Goodyear Tire & Rubber Co., has had his jurisdiction extended to the Cleveland and Toledo branches. The Detroit district, therefore, now comprises Detroit, Grand Rapids, Toledo and Cleveland. Concurrently, C. W. Holcker has been made manager of the Detroit branch.

C. C. Hinkley has been appointed chief engineer of the Chalmers Motor Co., of Detroit. He succeeds M. B. Morgan, who resigned. Hinkley has served on the engineering staffs of the Stearns, Peerless, Olds and Owens companies, but more recently has been connected with the Covert Motor Vehicle Co., of Lockport, N. Y., as sales manager. The vacancy in the Covert establishment has been filled by the appoint of N. Gould Allen.

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Guy Hess will open a garage in Panora, Ill.

Emil Faust is erecting a garage in Lead, S. D.

E. M. Clark is about to open a garage in Corcoran, Cal.

J. J. Anderson is building a garage in Cannon Falls, Minn.

James G. Duncan has opened a garage in Minnewaukan, N. D.

The Elmhurst Co. has commenced business in Carthage, N. Y.

Levi Ostlund is preparing to open a garage in Kerhoven, Minn.

A new garage is to be opened in Lisbon, Ohio, by Bert Hollinger.

Howard Bielenberg is building a two-story brick garage in Deer Lodge, Mont.

Norris A. Dunklee has opened a garage on South Main street, in Concord, N. H.

Herman Nolte, of Ellsworth, Minn., is erecting a building and will open a garage.

Frank Ort and Willard Z. Smith are about to build a $5,000 garage in Churbusco, Ind.

A garage is to be opened by Lewis Brunnell in the Levengood Building, Bellwood, Pa.

G. H. Derry has purchased two lots in Bethany, Mo., on which he will erect a garage.

Robert Shepard, of Warwick, N. Y., is erecting a garage at Lake street and Oak avenue.

An automobile repair shop has been opened in Tannersville, N. Y., by W. N. Romaine.

W. H. Leslie, of Bishop, Texas, is to build a $15,000 garage and machine shop in that town.

The Tri-City Auto Supply Co. has commenced business at 319 Nineteenth street, Rock Island, Ill.

William Jobes and Martin Davis, as the Altenheim Auto Co., have opened a garage in Wheeling, W. Va.

O. S. Lynds, of Kansas City, has started a vulcanizing business at 127 Locust avenue, Long Beach, Cal.

C. W. McBride and W. L. Jones, of Missoula, Mont., have formed a partnership and will open a garage.

The Gainesville (Fla.) Garage and Machine Co., has started a garage and secured the agency for Ford cars.

Albert Minzer, of Portersville, Cal., has leased property at 305 Oak street and is remodeling it for a garage.

An old Methodist Episcopal Church in Princeton, Mo., is being converted into a garage by Fred A. Lambeat.

H. V. Minor, of Oriskany Falls, N. Y., has been made agent in Oneida and Madison counties for Nuberg cars.

N. V. and H. N. Porter have started in business as the Maxwell Garage, at 420 Bank street, New London, Conn.

E. C. Crosby is to open a new garage in Brattleboro, Vt., in a four-story brick building now being constructed.

The Mission Garage and Auto Livery, in Chino, Cal., owned by James R. Bechtel, has been sold to Bert R. Moody.



FIVE STORY BUILDING OCCUPIED BY U. S. MOTORS' LONDON BRANCH

J. W. Hamilton has embarked in business in Joplin, Mo. His establishment is located at Fifth and Short streets.

J. D. Dicken and Albert Theerman have formed a partnership in Grundy Center, Ia., and will carry the Everitt line.

The American Motor Truck Delivery Co., of Toledo, Ohio, has changed its name to Heavy Tonnage Transportation Co.

The Greider Taxicab and Repair Co. is the name of a new concern in Dayton, Ohio; it is located at 22 Hanna lane.

The Fortuna Garage is about to begin operations in Fortuna, Cal. Ellis Robinson and Frank Hotstone are the proprietors.

Permission has been given Charles Thomas to build a brick garage at 2307-13 West Chicago avenue, Chicago, to cost $10,000.

Floyd Rose and R. Schnapp have purchased the garage previously conducted in Worthington, Minn., by Andrew Nystrom.

Howard Berg has been granted a permit to build a garage in Euclid avenue, Ontario, Cal. It is to be of brick and will cost $3,900.

Claude Younger has secured the E-M-F and Flanders agencies for Louisville, Ky., and will open salesrooms at 916 South Third street.

E. C. Taylor, of Coalville, Utah, has commenced business with the agency for Ford cars in Morgan, Summit and Wasatch counties.

H. L. Slagle has purchased a half interest in the Krit agency in Salem, Ohio, and will conduct a garage in connection with the business.

J. E. Smith and Napoleon Tetrault are partners in a new automobile sales business in Walhalla, N. D. They will sell Mitchell cars.

Roman Eckstein has purchased a blacksmith shop at Clear Lake, Minn., and is tearing it down to make room for a garage he is to start.

The Novelty Automobile & Repair Co., has been formed in Milwaukee, Wis., and will operate a repair shop and garage at 140 Michigan street.

William J. Pike, of Rochester, N. Y., is preparing to erect a brick garage at 103 East avenue. It will be three stories high, and will cost $25,000.

Max Davidson, of Liberal, Mo., has sold his garage business to Charles Nielsen and T. A. Wright. Davidson, however, will retain the Ford agency.

The Howard Co., in New Haven, Conn., has secured permission to build a brick garage at Plymouth street and the boulevard. It will cost $3,000.

The American Auto Co., agent for American cars, has commenced business at Davenport, Ia., at 211 East Second street. A garage also is maintained.

The Abbeville Motor Car Co., South Carolina distributors of Everitt cars, shortly will open a branch in Columbia; L. F. Griffith will be the manager.

Dietrich W. Kaatze, of 113 Keap street, Brooklyn, N. Y., is erecting a four-story brick garage at Ten Eyck and Lorimer streets. It will cost $5,000.

Permission has been granted Joseph Paquet to erect a three-story garage at Hawthorne avenue and East Eighth street, Portland, Ore. It will cost $2,500.

Murray Schermerhorn, of Chatfield, Minn., has purchased the Standard Lumber

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Co.'s property at Twiford and Second streets and will start a garage.

H. P. Reed and other Hibbing, Minn., men, are planning the construction of a garage in Third avenue. It will be of brick and steel, 100 x 56 feet, two stories, and will cost $23,000.

Fred Dundee, formerly connected with the White Motor Car Co. in Portland, Ore., has started a garage of his own at 575 Jefferson street, that city. His place of business is 100 x 100 feet.

Elbert Tappen is planning a new garage in Oyster Bay, N. Y. It will be of steel and concrete, 40 feet square in floor space, and will be located on the rear of Tappen's property in South street.

J. A. Muehleisen has sold his interest in the Luttrell Co., of Washington, D. C., to Samuel A. Luttrell, leaving the latter sole owner of the firm. The Luttrell Co. has the agency for Packard cars.

D. H. Sloan and his son, Fred Sloan, trading as the Lakeland Automobile & Supply Co., have opened a garage in the Peacock Building, Lakeland, Fla. They are handling Penn, Case and Maxwell cars.

The Mitchell, Lewis & Staver Co., which maintains stores in Portland, Seattle, Spokane and Boise, and which a year or so ago relinquished the sale of Mitchell automobiles to devote itself wholly to horse vehicles, has re-entered the automobile trade. It will agin handle Mitchell cars...

To distribute Baker electrics, the Baker Electric Co., of Michigan, has been formed, and will have an office and salesrooms at 815 Woodward avenue, Detroit. The officers of the new concern are: President, F. C. Walker; vice-president, R. C. Norton, Cleveland; secretary and treasurer, W. H. C. Burnett.

An electric garage and charging station is to be established in Minneapolis, Minn., by the Kemp Brothsrs Automobile Co., at 1917-23 Hennepin avenue. The structure will be completed by August 1 and will cost $50,000. The exterior will be tapestry brick and will harmonize with other nearby apartment houses and buildings.

The Cunningham Automobile Co., of Des Moines, Ia., distributor of Hupmobile and American cars in the greater part of Iowa, has been bought by H. H. Polk and will be known hereafter as the Central Iowa Motors Co. William R. Cunningham, the former owner, contemplates opening a second-hand business under the name, Western Automobile Clearing House.

Thomas W. Pelham, general counsel for the Gillette Safety Razor Co., has formed the Lippard-Stewart Motor Sales Co. of New York, with himself as president, and his son, Thomas W., Jr., as secretary and treasurer. Clifford E. Dunn is vice-president. The company, which, as the title indicates, will handle Lippard-Stewart trucks, is capitalized at $25,000 and has opened up at 1700 Broadway.

MEN BEHIND THE CENTURY ELECTRIC

Its Formal Incorporation Discloses Their Identity—Strong Hands at the Helm—Factory Now in Sight.

Although it has been in being for several months, the Century Electric Car Co., of Detroit, became a corporation only last week when its "papers" were filed with the Michigan authorities. Its paid in capitalization is $100,000, and the formal election of officers indicates that the company does not lack substantial backing and influence.

The officers are as follows: President, John Wynn, Jr., a well-known Detroit real estate dealer; vice-president, Charles L. Weeks, of Hunton & Weeks, wholesale lumber dealers; secretary and treasurer, Edward Atkins, formerly auditor of the Studebaker Corporation, Detroit division, and previously auditor of Berry Brothers, Ltd., varnish manufacturers; general manager, John B. Gillespie. In addition to the officers the directors are: William A. Jackson, who is president of the Home Telephone Co.; Phillip Breitmeyer, formerly Mayor of Detroit and one of its wealthy citizens, and Howard Streeter, attorney for the Pere Marquette Railroad.

Among the other stockholders are Charles Kanter, president of the German-American Bank; Bethune Duffield and George F. Monaghan, attorneys; A. D. Porter, treasurer of the Ignition Starter Co.; James B. Mackay, real estate dealer; Max C. Koch, City Treasurer; William S. Pagel, of the Gordon-Pagel Baking Co.; George C. Conn, freight traffic manager of the Pere Marquette Railroad, and Albert K. Hunton and F. Spies, lumber dealers.

Several factory sites are under consideration and a selection probably will be made within the next few days. It is the intention to build 200 cars during the first season. Orders for most of them already are in hand.

Charity and Commissions Lead To Law.

Sixty dollars, alleged to have been contributed to the Congregation Shaari Zedek, May 26, 1910, by the Peerless Garage & Sales Co., of Brooklyn, at the request of the Mercer Automobile Sales Co., of New York City, is a part of the amount asked in an action now on the calendar of the Supreme Court in New York county, wherein the Peerless company asks a total of $526.72. Automobile firms often have been generous contributors to charity and seem to have followed the saying, "Cast thy bread upon the waters and it shall return unto thee," but the Peerless company has found it necessary to seek legal assistance in getting back its "bread". The complaint is that the money contributed was for the Mercer company and that the latter promised to pay it back, but failed to do so.

Both firms have been out of business for some time, at least under their former titles, and with the old personnel. In the Peerless company Frank Dunham was president and Louis Burstein secretary and treasurer. T. L. Hausmann was sales manager of the Mercer concern, and Frederick Kuser was another member of this agency. In New York the Mercer is now in new hands, while the Peerless business is continued under a new name in the old locality. Another part of the suit is for $466.72, which the Peerless company claims is due it as a part of $1,000 which it deposited with the Mercer company when it contracted as Brooklyn sub-dealer for Mercer cars. With each car sold $66.66 2/3 was to be paid back. Eight cars are claimed to have been sold, making a return of $533.28 and leaving a balance due of $466.72.

N. A. A. M. to Form Local Show Circuit.

As a result of demands made on manufacturers by the overgrowth of local show promoters, and in line with the recommendation made by President Metzger in his annual report in February last, the National Association of Automobile Manufacturers has undertaken to relieve the situation by organizing a circuit of local shows. To that end, the N. A. A. M. show committee shortly will extend invitations to the show promoters of a number of cities to meet for a full discussion of plans for the proposed circuit.

Under the rules of the association, no manufacturer, as such, may take part in a local show, but in the event that his dealer contracts for space he may supply a show chassis, a salesman or salesmen, literature, and contribute to the advertising expense, but with more than 70 show promoters voicing demands the burden became too great to be longer carried.

In seeking relief by the formation of a circuit, it is not the intention to prevent the holding of any show, but as the circuit will include the principal cities it will be so arranged that dates will not conflict, and as it will have the approval of the N. A. A. M., it is more than likely that the members of the N. A. A. M. will find it advantageous to support only those shows which are in the circuit.

Flanders Gas-O-Electric Goes to Pontiac.

The Gas-O-Electric Co., of Detroit, which comprises Walter E. Flanders and E. LeRoy Pelletier, of the Flanders Mfg. Co., and Harry Cunningham, the Flanders agent in Detroit, has removed its plant to Pontiac, Mich., where the Flanders factory itself is located. The Gas-O-Lock device, made by this company, consists of a lighting plant, the electric energy being stored up by means of a stationary gas engine. When the supply reaches a certain point, the engine immediately starts and commences to charge the batteries and when they are fully charged it automatically cuts off.

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DIESEL ENGINES AND THEIR DEVELOPMENT.

When automobile manufacturers turn seriously to the production of the Diesel engine, and in view of the utterances of Dr. Rudolph Diesel and the opinions of a great number of other gas engine experts who concur with him that day may not be very far removed, it should be remembered that experience gained in the building of the conventional types of internal combustion engine scarcely will be more than mediocre at best.

Because the steam engine and engines operating on the Otto principle have been in existence for years and because in those years of production a great deal of helpful experience has been gained, manufacturers of those engines now are permitted to give to the world mechanisms that are very nearly the last word in perfection. Improvements are made from time to time, it is true, but it is the experience that has been gained in building that has borne fruit in the form of advancement. And this experience extends over a period of years that reaches back to long before the Diesel engine became known, or was even thought of.

Admittedly, such experience may be relied upon to a certain extent in the production of Diesel engines. Nevertheless, the Diesel engine occupies a field that is brand new to the majority of manufacturers who confine their operations to the production of prime movers of small power—to all intents and purposes it is virgin ground. Fifteen years' experience in the production of one particular type of engine—which is all that the manufacturers of Diesel engines can claim, and the majority of them cannot even claim that much—may sound like a whole lot to the uninitiated, but it has required more than ten times that length of time to bring the steam engine to its present state of perfection.

All of which is merely by way of pointing out that there is comparatively little experience to draw upon, and inasmuch as it has been proven that experience counts just as much, if not more, in the construction of Diesel engines, it would seem that at least a modicum of the discouragement meted out to the early producers of other types of engines may be the portion of those who essay the Diesel automobile engine. Still, in the short time the Diesel engine has been in use it has attained to heights that were not reached by other prime movers in a very much longer period. With the achievements of the engineering fraternity in other fields in view and considering the excellent start the Diesel engine has made, it scarcely will be long before manufacturers will be able to obtain commercially the nicety of "fit" that is so essential to its operation and with the advances which almost daily are being made in the science of metallurgy weight reduction will come as a matter of course.

BEFORE PURCHASING TRUCKS AND AFTERWARD.

It is a fact generally known to those familiar with motor trucking that practically any heavy hauling that can be done by horses can be done more economically by machines. Despite such knowledge, however, every prospective purchaser of a motor truck finds it necessary to take a great deal of trouble, and put the truck salesman to even more trouble, in order to ascertain, to the last penny, just what he may expect to save by changing from horses to mechanical transportation.

This is all right in itself, but the point is that if the purchaser of a machine would spend as much time in arranging for the housing and care of his truck or trucks, the loading and unloading facilities and so on, as he does in figuring his profits ahead, he would in all probability realize a greater saving under given conditions than any fair-minded salesman would care to promise. It is a hard fact, and one that is driven home almost every time a truck is purchased, that the owner's interest rises to its maximum while the truck is doing its first two or three days' work, and thenceforth tapers off until he ceases to take any lively personal interest in the matter, leaving the car and its management in the hands of subordinates who, as a rule, are familiar with horse hauling conditions and spend most of their time working with horse haulage in view—obviously not the best thing in the world for the motor vehicle.

While of course it is good business policy to make sure that the machine will be a paying investment—otherwise there would be no object in purchasing it—it is even more important, once the purchase has been decided upon, to take pains to have the arrangements for handling the truck, in the garage as well as when at work, made from a motor truck standpoint and not from the point of view or horse haulage, and also to see that the arrangements are so made that when the owner's first keen interest becomes dull, as inevitably it will, and he ceases to regard the machine as a new toy and considers it only as a wheel in his business, the truck will nevertheless receive the care and attention it requires and there will be no danger of its failure because of lack of favorable working or neglect or carelessness in the matter of upkeep.

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ONE CAUSE OF "CHAUFFEUR EVILS"

Garageman Contends "Aloofness" of the Car Owners Unfavorably Affects Conditions—His View of the Situation.

"If more garagemen knew more of the owners of cars that are stored with them, some of the so-called garage evils and chauffeur evils might be eliminated, or at any rate their extent might be considerably reduced," a few days since remarked a New York garageman who has a reputation for being "straight," and whose establishment is so laid out that it prevents at least a few of the chauffeurs' tricks.

"As it is," continued the garageman, "we frequently do not see the owner of a car from one year's end to the other. In my own establishment, there are cars that have been stored for two years or more and I do not even know what their owners look like. If I did not receive their checks each month, I scarcely would remember their names. They leave everything to their chauffeurs; and as these conditions exist quite generally, it is not wholly strange that evils should develop, and that so many garagemen 'stand in' with the chauffeur. If we saw the owners occasionally, and knew what manner of men they were, we would be better able to know how to act when action became necessary. When, as now is too generally the case, the owner knows only what the chauffeur tells him, and believes all that is told to him, the garageman is more or less at the chauffeur's mercy. Of course, there are exceptions to every rule but, ordinarily, he can 'queer' us whenever he is inclined to do so. We can lose a man's patronage without any reason whatsoever and know nothing about it until the car is removed, largely because we never have seen the owner and have no opportunity of presenting our side of the case when occasion requires.

"Not all chauffeurs are bad, and we have a pretty good lot in our establishment. Of necessity, they must be fairly 'straight' or they would not long remain with me. There is no room or corner where they can shoot craps or play poker, and as a member of my own household is my night manager, the opportunity for joy-riding or night-hawking is so small that any chauffeur who is inclined that way will think twice before he attempts anything of the sort. Also, I give no 'rake-offs' or commissions of any kind. It is my desire to act with and for the owner. I give him his due, by which I mean to say that I allow him a discount of 5 per cent, for cash on all bills. I pay nothing to chauffeurs. If I pursued the other policy, I probably would have to add another story to my garage; but, take it from me, that amount of graft that is solicited, or demanded, by chauffeurs, and that is paid to them, is not short of astounding.

"Only yesterday a half-decent chauffeur dropped in and offered to store his car, or rather his boss's car, if I would make it worth while. He now stores at one of the most notorious crap-shooting, joy-riding 'joints' in our neighborhood, and as he is neither a crap-shooter nor a joy-rider the atmosphere is not congenial. He is anxious to make a change but will not make it simply because he gets a 'rake-off' from the 'joint' to which I refer. When I told him it was my policy to allow the car owners themselves 5 per cent. discount, and that I could not afford to do more, he brazenly suggested that he might make the necessary arrangement with the man on the floor; that is, he proposed making an arrangement with my employes to give short measure when gasolene and oil tanks were filled and the owner to be billed for the full quantity, while the difference would constitute the chauffeur's 'rake-off.' He admitted that he had an arrangement of the sort with the garageman with whom he now stored, although he need not have admitted it as I know only too well that the practice is a too common one. If more owners would watch the fuel consumption of their cars, and match it against their mileage records, and if they were not so easily gulled by the excuses that chauffeurs offer and by the blame which the latter usually throw on the garagemen, they soon would be able to get a line on their drivers. I know one owner who employed a smart, gentlemanly driver who, by keeping track of his gasolene consumption for a couple of months, found that the polite young scamp was a joy-rider of the worst kind, and, incidentally, discovered why his car usually was operating badly.

"The main point, however, that I wish to emphasize is that if garagemen could meet the car owners occasionally, or had a definite understanding with them, there would be less trouble and more satisfaction all around."

United States Rubber to Issue Bonds.

Negotiations are in progress for acquiring additional capital for the $50,000,000 United States Rubber Co., which is the parent of both the Rubber Goods Mfg. Co. and the United States Tire Co. It is probable that they will result in a bond issue of $15,000,000 or $20,000,000, though the total authorization may be sufficient to provide for refunding operations for many years to come. President Colt, of the United States Rubber Co., admits that the negotiations are in progress, and states that the new capital is necessary to meet the **continuous growth** of the business and to be always at the "highest point of development with respect to securing our supply of crude rubber, as well as in respect to manufacture and distribution."

Among other things it is stated the United States Rubber Co. will require a considerable amount of funds for the financing of its rubber plantations in the Far East. Such an outlay yields very little return for many years, but the company is attempting through these plantations to make itself independent of the general rubber market.



May 11, Atlanta, Go.—Hill climb under the auspices of the Atlanta Automobile and Accessories Dealers' Association.

May 18, Washington, D. C.—Sociability run of the Washington Automobile Club.

May 25, Newark, N. J.—Motor truck parade under the auspices of the Newark Automobile Dealers' Association.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

Unusual Suit Involving Storage Charges.

Whether the theft of a check by an employe constitutes a failure of the intended payment to the employer is the principal and most interesting fact to be argued in an action brought by O. B. Thomas, a New York attorney, against the Belnord Automobile Storage & Supply Co. in the New York Supreme Court of New York county. Thomas swears he sent to the storage company checks in payment for four months' storage of his automobile, and the storage concerns claims it never received the checks, alleging that one of its office employes forged the firm's endorsement and kept the proceeds. Thomas replevined the car when it was refused him, and the present action is to determine whether payment has been made. The checks, Thomas states, were endorsed and cashed and the amount of the storage bill was paid out of his bank account, so that if he is compelled to settle again it will make double payment from his standpoint.

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TETZLAFF AVERAGES 78.5 M. P. H.

Fiat Pilot Maintains Phenomenal Speed at Santa Monica — Men in Lighter Car Events Also Shatter Records.

When Harvey Herrick drove a National car over the Santa Monica course last year, and made an average of 74.62 miles an hour in a 202-mile event, he proved that the course was lightning fast—so fast that it seemed probable that the record would not soon be bettered. But despite prophecies and beliefs Herrick's time was knocked galley west on Saturday last, 4th inst., by Theodore Tetzlaff, who drove a Fiat model 36 times around the 8.4 miles circuit in 3:50:57, covering the 303 odd miles at the phenomenal average rate of 78.5 miles an hour.

The free-for-all event in which Tetzlaff performed the feat was not, however, the only race in which records were broken. In the first event of the day, 101-miles for cars of 161-230 cubic inches piston displacement, George Joermann, in a Maxwell, averaged 61.86 miles an hour as against 59.20 made in a similar event last year by Louis Nikrent driving a Buick. The medium car event, too, produced a new record when Ralph De Palma piloted his Mercer over the 151 miles, averaging 69.54 miles against 68.78 made by Keene in a Marmon car last year.

Tire trouble as usual played a part in the results, and while it detracts nothing from Tetzlaff's glory, it is an open question if Caleb Bragg, his Fiat team mate, might not have won the free-for-all if he had suffered fewer tire stops in the closing rounds; he certainly was going great guns and had every chance for a look-in. Similarly, Bruce-Brown, in the Benz, might have replaced Bragg as the runner-up but for the same cause. He was in second place when his tires forced him to stop, and when he again got going Bragg had passed him, and Brown and all the others behind him were flagged before they could officially finish the race. Of all the tire sufferers, however, Bert Dingley, the Simplex entry, was the worst. He stopped exactly 21 times. Making his first appearance since his reinstatement, Barney Oldfield also had his troubles, but they were spring troubles. He lost six laps due to the breakage of spring clips, and though hopelessly out of it he persevered until flagged on his 24th lap.

The victory of Joermann, the Maxwell driver, in the light car event was the real surprise of the day. He was little touted and little fancied, but he won, and by a comfortable margin and in record time. Second honors went to Robert Evans in a Flanders, who finished 2:40.97 behind Joermann, who was followed 1:21.04 later by J. Tower, his Flanders team mate. But Evans and Tower both may lose their honors before the A. A. A. is through with them.

In the medium-car race, De Palma's triumph in the Mercer was clean cut and decisive. He finished nearly five minutes in front of Joseph Nikrent and nearly 12 minutes ahead of Disbrow, the other Case representative. None of the other drivers finished, engine trouble having caused the withdrawal of Earle Devore in a Buick, R. Jeffkins in a Mercer, and Frank Siefert in a Midland; the other contenders were flagged on the course.

All of the machines which competed in the three events qualified, some of them at the eleventh hour, according to the Contest Board standards and requirements, save the two Flanders machines, which, as stated in the Motor World of last week, were disqualified because the board did not deem them strictly Flanders models, the motors being nearly 50 per cent. oversize. These cars were allowed to compete, despite the fact that telegraphic orders to the contrary were sent to both R. T. Hillman, referee, and to E. G. Cooster, the A. A. A. representative, as well as to A. M. Young, the promotor of the race. Why these orders, which were final in that they forbade the participation of the cars in question even under protest, were disobeyed or ignored, is a matter of conjecture, as the merits of the case cannot be passed on until the official reports of the race are received by the contest board. But from this distance it looks as if the three officials and the two contenders are "in bad."

Tetzlaff's Fiat had Miller shoes on the rear, Michelins on the front wheels. The winning cars in both of the other events were Michelin shod. Bosch magnetoes were carried by both of the machines which finished in the free-for-all, and like equipment supplied the ignition for the winning Mercer in the medium event. The summary:

Free-for-All—303.02 Miles.

Theodore Tetzlaff, Fiat	3:50:57
Caleb Bragg, Fiat	3:54:05
David Bruce-Brown, Benz	Flagged 35th lap
David Lewis, Stutz	Flagged 34th lap
Earle Cooper, Stutz	Flagged 34th lap
Bert Dingley, Simplex	Dropped 32nd lap
Berna Oldfield, Fiat	Flagged 24th lap

231-300 Inches—151.506 Miles

Ralph De Palma, Mercer	2:10:43
Joseph Nikrent, Case	2:15:20
Louis Disbrow, Case	2:22:23
Scott Miller, Warren	Flagged 17th lap
H. A. Shain, Schacht	Flagged 10th lap
Earle Devore, Buick	Dropped 6th lap
Rupert Jeffkins, Mercer	Dropped 2nd lap
Frank Siefert, Midland	Dropped 1st lap

161-230 Inches—101.004 Miles.

George Joermann, Maxwell	1:37:57
Robert Evans, Flanders	1:40:38
J. Tower, Flanders	1:42:00
R. L. Anthony, Regal	1:42:50
H. C. Krause, Reo	1:54:33
Louis Nikrent, Buick	2:00:08
Victor Roschen, Ford	Flagged 10th lap
A. J. Charles, Ford	Dropped 7th lap

Fairmount Park Race Off Forever.

All doubts regarding the future of the Fairmount Park road race were removed yesterday. It if off for all time, the Philadelphia Park Commission having adopted the resolution which kills and buries it.

SPEED THAT BURNED BOARD TRACK

But Not All Records Claimed by Los Angeles Likely to "Pan Out"—Honors Are Well Distributed.

Los Angeles undoubtedly witnessed some swift driving during the meet which occurred on the one-mile circular board track there on Sunday last, 5th inst., but whether all of the records which it is claimed were "remade" at that meet will actually stand as such is doubtful, if the rules of the Contest Board and the reports of the conditions under which the races were run have been correctly interpreted.

Altogether five records are claimed to have been broken, viz.: Five miles for cars in the 300-inch class, by Joseph Nikrent (Case). Time, 3:44.3. Record held by Ray Harroun (Marmon). Time, 3:55.97. Five miles for cars in the 600-inch class, by Louis Disbrow (Simplex). Time, 3.25.10. Record held by Berna Oldfield (Knox). Time, 3.38.61. Ten miles for cars in the 300-inch class, by Louis Disbrow (Case) Time, 7:46.6. Record held by Harris Hanshue (Mercer). Time, 7:47.20. Five miles regardless of class, by Caleb Bragg (Fiat). Time, 3:11.15. Record held by Ralph DePalma (Fiat). Time, 3:15.62. Twenty-five miles for cars in the 231-300-inch class, by Joseph Nikrent (Case). Time, 18:53.2. Record held by R. Jeffkins (Schacht). Time, 19:48.97.

The first three of these newly created "records" in all probability will not stand investigation by the Contest Board, for, according to the latest advices they were made in time trials, which, according to the rules of the board, would place them in the "regardless of class" column, whereas claims are entered for records under Class C events. Records made in Class C events must be made in competition.

Of the fifteen events which were embraced in the program, seven were trials against time and in four of these time trials claims are made for records. The honors in the six competitive events were about equally shared by Ralph DePalma, Louis Disbrow and Joseph Nikrent, who piloted machines in the heavy car evnts, and between Robert Evans and J. Tower, both of whom piloted their E-M-F-Flanders machines to victory in one or the other of the 231-inch displacement and under class events. The free-for-all which went five miles, and the handicap event over a similar distance were won by Caleb Bragg (Fiat) and Neil Whalen (Case), respectively. The summary:

Five miles; Class C; 231-300 inches displacement—Won by Ralph DePalma (Mercer); second, Joseph Nikrent (Case); third, Louis Disbrow (Case). Time, 3:44.3.

Five Miles; time trial—Joseph Nikrent record under Class C event; 300-inch dis- (Case). Time, 3.44.3.

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Five miles; Class C; 231 and under displacement—Won by Robert Evans (E-M-F); second, J. Tower (E-M-F); third, George Joermann (Maxwell). Time, 4:21.

Five miles; Class C; 451-600 inches displacement—Won by Louis Disbrow (Simplex); second, Joseph Nikrent (Case); third, Neil Whalen (Case). Time, 3:55.2.

One mile; time trial—Berna Oldfield (Benz). Time, :40.30.

One mile; time trial—Louis Disbrow (Case). Time, :40.15.

Two miles; time trial—Louis Disbrow (Case). Time: First mile, :38; second mile, :42.4.

Five miles; time trial—Caleb Bragg (Fiat). Time, 3:11.15.

Five miles, free-for-all—Won by Caleb Bragg (Fiat); second, Louis Disbrow (Simplex). Time, 3:18.

Five miles; time trial—Louis Disbrow (Simplex). Time, 3:25.10.

Fifteen miles; Class C; 231-300 inch displacement—Won by Ralph DePalma (Mercer); second, Joseph Nikrent (Case); third, R. Jeffkins (Mercer). Time, 11:30.9.

Twenty-five miles; Class C; 161-230 inches displacement—Won by J. Tower (E-M-F); second, R. Anthony (Regal); third, George Joermann (Maxwell). Time, 21:12.8.

Twenty-five miles; Class C; 231-300 inches displacement—Won by Joseph Nikrent (Case); second, Ralph DePalma (Mercer); third, R. Jeffkins (Mercer). Time, 19:00.05.

Five miles; handicap—Won by Neil Whalen (Case); second, Louis Disbrow (Case); third, Joseph Nikrent (Case). Time, 5:06.5.

Ten miles; time trial—Louis Disbrow (Case). Time, 7:46.6.

Jerseymen Honor Their "Deliverers."

Having brought New Jersey back into the Union, the three legislators who were responsible for that notable achievement were banqueted on Sunday evening last, 5th inst., by the men who worked with them outside the legislative halls and who, therefore, were in position most to appreciate their efforts.

The legislators who were honored were Senators Colgate and Edge and Assemblyman Stickel, whose splendid efforts ended in turning defeat into victory and in passing the reciprocity bill enacted by the New Jersey legislature last month. The men who honored them constituted the Legislative Committee of Fifteen, which was the title under which the New Jersey motorists conducted their campaign. The banquet was held in Washington Hotel, Newark, and was marked not merely by good fellowship but by words and proofs of sincere appreciation. Assemblyman Stickel, the youthful father of the reciprocity law, was presented with the fountain pen used by Governor Wilson when he signed the bill, while Senators Colgate and Edge were given engrossed resolutions expressing the committee's esteem and gratitude for the services they had rendered.

27 ENTERED FOR THE SWEEPSTAKES

Long Whirl on Indianapolis Speedway Attracts a Representative Field—Who They Are—Pace That is Probable.

If for no other reason than that the drivers who last Decoration Day participated in the first 500-mile Sweepstakes race on the Indianapolis Speedway prophesied the average speed that would be made by the winner almost within a mile, it is reasonable to expect that teh 77-mile average that has been forecast for this year's race, which is to take place on the 30th inst., will be realized. But there are other reasons why Ray Harroun's winning average of 74.59 miles an hour should be beaten and badly beaten, too. Primarily, it has been beaten twice in road races—Herrick did it last Fall when he averaged 74.63 miles an hour in California, and only last week Tetzlaff lowered even that record, also in California, by traveling 303 miles over roads at an average rate of 78.50 miles an hour—and though the distances in each case were considerably less than the five centuries grind, the surface of the Speedway offers facilities for speeding that are so vastly superior, there seems little doubt but that a new record for the distance will be established.

Another reason is that most of the drivers who are entered are 500-mile race veterans, and whereas the course was more or less new to all of them last year, this year it will prove familiar ground, and the experience which was gained in the first race will be employed to good purpose when the drivers line up and are sent away. Still another reason is that the test for eligibility this year was set at one complete lap, which the drivers were compelled to negotiate at the rate of 75 miles an hour; last year a speed of 75 miles an hour for only one mile was sufficient. Except that the cars were restricted to 600 cubic inches piston displacement and that they must weigh at least 2,000 pounds, there were no other restrictions, nor are there any other restrictions this year.

When the entry list was declared officially closed at midnight of May 1st there were 27 cars entered, and though it is possible for the list to be further swelled by special dispensation, it is unlikely that any more names will be added; at any rate 30 is the limit. But whether they are or not, the most ardent race "fan" scarcely could wish for a more representative field, and it is doubtful if any amount of wishing could evolve more genuine "class." All the big fellow's names are there: Tetzlaff with his last love, a Fiat; De Palma and Wishart, the Mercedes twins; Wilcox and Don Herr, the rising star, the National twins; Herrick, who was a National pilot but who has gone over to the Case pro tem., at least; Burman, with a specially constructed Cutting, which is said to have tremendous speed; Hughie Hughes, whose Mercer has been practically unbeatable in its particular class during the past year; Len Zengle and "Charlie" Merz, who both will hold the wheels of Stutz cars; Bert Dingley, Lee Frayer, "Billy" Endicott and any number of others whose reputations reach far before them everywhere. Not all the drivers have been nominated and in one case, No. 26, even the name of the car and its entrant are withheld. The complete list as it stands at present being as follows:

No.	Driver and Car.	Piston Displacement.
1.	Gil. Anderson, Stutz	390
2.	Len. Zengle, Stutz	390
3.	Theo. Tetzlaff, Fiat	589
4.	Ralph De Palma, Mercedes	583
5.	Louis Disbrow, Case	448
6.	Harvey Herrick, Case	448
7.	Spencer Wishart, Mercedes	583
8.	Howard Wilcox, National	589
9.	Don Herr, National	448
10.	Harry Knight, Lexington	421
12.	Bert. Dingley, Simplex	593
14.	Wm. Barndollar, White	489
15.	Robert Burman, Cutting	598
16.	Lee Frayer, Firestone-Columbus	432
17.	Wm. Liesaw, Marquette-Buick	594
18.	Wm. Endicott, Schacht	390
19.	Ralph Mulford, Knox	597
21.	Hughie Hughes, Mercer	300
22.	Joe Horan, Lozier	544
23.	M. Marquette, McFarlan	425
24.	———, Opel	—
25.	Joe Matson, Lozier	544
26.	———, Mystery	—
27.	John Jenkins, Continental	286
28.	Chas. Merz, Stutz	—
29.	———, National	448
31.	———, Mason	240

Because it has been judged that the number "13" might engender superstitious feelings, it has been left out. The other numbers which are missing—11, 20 and 30—have been eliminated in order to reduce the possibility of errors occurring when the numbers are called out as the cars pass, it being held that the passing of cars number 20 and 2 close together, for instance, might serve to confuse the scorer, with the result that car number 22 might receive credit for a lap it had not made. Already the great 2½-mile oval is being prepared for the fray, and what with carefully groomed surface and everything made spic and span, it is altogether likely that the coming event long will be remembered, for even though the field of contestants is smaller by ten or a dozen cars than it was last year, that fact alone ought to conduce to better speed being made and to fewer accidents.

Build Home For Watertown City Cars.

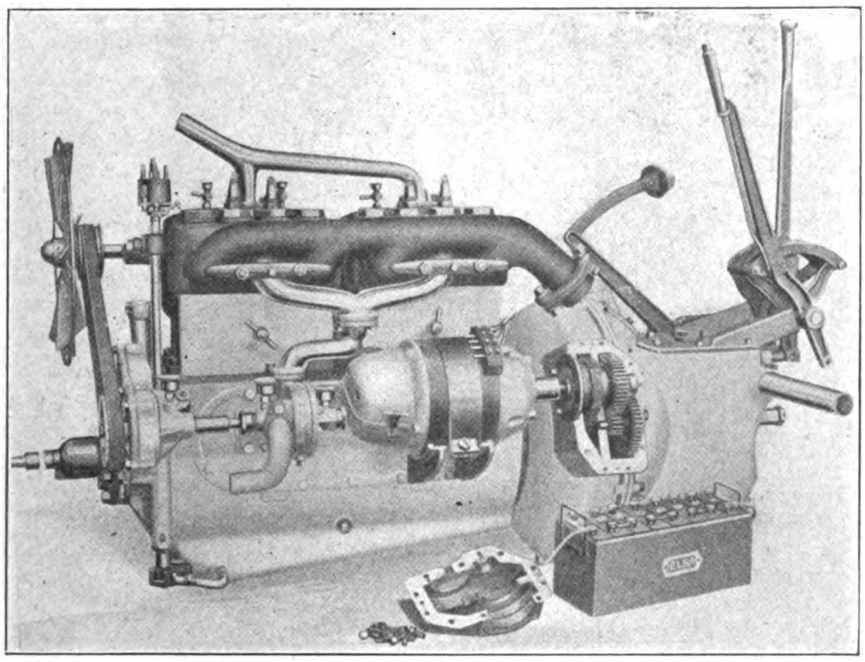
Watertown, N. Y., which several years ago placed itself in the front rank of up-to-date municipalities by installing motor cars for city service, is preparing to build a garage for the housing of this equipment. Proposals for the furnishing of material and labor will be received until 2 p. m., May 8, at the Supervisors' Chambers by the building committee and architect. Specifications also provide that part of the building shall be a stable for the horses still owned by the city.

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HAZARD'S NEW UNIT IS COMPLETE

Even To the Engine Starting and Lighting System Which is "Built in"— Light Weight a Feature.

Carrying a little further than is usual, the idea embodied in the phrase "unit power plant," the Hazard Motor Mfg. Co., Rochester, N. Y., has added to its already extensive line of motors for pleasure and commercial vehicles, a new product which combines in a unit motor, clutch, change gear mechanism and engine starting device. In bringing out the new unit, which may be styled a unit power plant in the broadest sense of the meaning, due cognizance has been taken of the desirability of providing an engine starter which shall operate to "turn the engine over" until the proper adjustment of spark and throttle levers has been made, and to this end the manufacturers have adopted the combination electric motor and generator as the best solution of the problem, this particular portion of the unit being the product of the North East Electric Co., also of Rochester.



HAZARD POWER PLANT AND ENGINE STARTER COMBINED

In directing attention to its new production, particular emphasis is laid on the fact that the engine-starting and current-generating portion is "built in place" on the engine, the original engine designs having been modified slightly to make provision for it. Thus it becomes an integral part of the unit and its harmonious action with the whole is assured. As may be seen by the accompanying illustration, the motor generator is attached to the engine by means of two supports which are integral with the crank case. Contrary to the usual practice, the motor-generator is not driven through the pump or magneto shaft (as a matter of fact there is no magneto, its functions being performed by the generator), but is driven directly from the flywheel by means of carefully cut gears and a substantial chain of the "silent" type. Both the gears and the chain are fully enclosed in the flywheel housing and normal wear is reduced to the minimum by causing them to operate in an oil bath.

The motor-generator itself is small and compact and has but a single moving part, namely, the armature. There are no governing devices whatsoever, in the strict sense of the word, the generator output being maintained practically constant regardless of the speed of the engine by reason of the field winding which is such that wide variation of armature speed cause little fluctuation in the line. The armature is mounted on annular ball bearings, as are the driving gears, and particular pains has been taken to insure that all parts shall be positively moisture proof. In addition to the motor-generator, and the storage battery, which is included as a matter of course, the system includes complete wiring equipment and a starting and light switch that effectually precludes the possibility of the lights being turned either on or off or the engine started except with the aid of a special key. To insure that the engine will not be started with the spark advanced to the position where a "back kick" is imminent, an ingenious arrangement is made use of whereby it is impossibile to close the starting switch except when the spark control lever is in the full retard position.

To start the motor it is merely necessary to adjust the control levers as they would be adjusted if the ordinary crank were to be used and to press the dash starting switch. This switch, which is a small swinging lever, is maintained closed until the engine takes up its regular cycle of operations when it is released and automatically returns to its original position. Immediately the engine commences to fire, a friction clutch positively and automatically disconnects the gearing through which the motor-generator drives the engine and the generator then is driven at twice crankshaft speed through the intermediary of the "silent" chain. As the storage battery thus is maintained in a constantly charged condition that is a practically unlimited source of current for lights and ignition. The battery which is supplied is the product of the Willard Storage Battery Co. and gives 16 volts, the capacity being 50 ampere hours.

The total weight the starting and lighting system adds to the weight of the complete unit is 150 pounds. Barring the lighting and starting system, the unit consists of the standard Hazard 4x4½ motor combined with a multiple disc clutch operating in an oil bath and a three-speed selectively operated change speed mechanism. The unit is arranged for three point support and is supplied complete with control pedals, starting crank (detached), oil and water pumps, fan, exhaust, intake and water manifolds, one set of spark plugs and either Schebler or Stromberg carburetter.

Vermont Stages a Late Spring Show.

The Burlington (Vt.) Automobile Dealers' Association closed its second venture in the automobile show line, in the State Armory, on Saturday last, 4th inst., with just one shy of a dozen motor vehicle exhibitors. The booths which served to surround the 17 different makes of cars which were represented, were tastefully decorated, and in nearly every case accessories as well as machines were on view. The dealers who staged motor cars during the week were: H. G. Bennett, Cadillac; H. D. Drury, Westcott; Flanders Auto Co., E-M-F, Flanders, Chalmers, Overland, Jackson; George D. Jarvis & Son, Ford; Walter B. Johnson, Velie and Paige-Detroit; A. F. Lauzon & Co., R-C-H; J. Horton Lockwood, Buick; H. S. Morgan, Hudson; Van Ness Garage, Mitchell and Reo; Vergennes Auto Co., Oakland; H. L. Ward, Stearns.

Extent of Switzerland's Motor Trade.

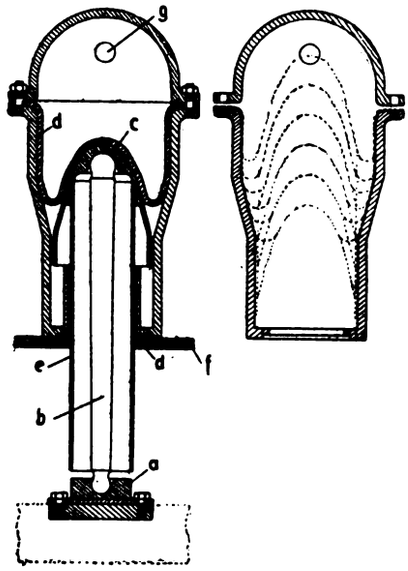
According to the most available statistics, there are registered in Switzerland 3,900 pleasure cars and 550 trucks. While most of the trucks are of home manufacture, the cars were imported, France supplying by far the greater number. The "American invasion" has been felt not at all in the rock-ribbed republic, practically no American cars being in use there. Although two of the truck manufacturers have attained international prominence, Switzerland's automobile industry, measured by American standards, is almost insignificant. During the year 1910, the eight larger manufacturers produced but 923 chassis. In 1911 the number was increased to 1,050, of which 680 were exported.

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SAURER ADOPTS PNEUMATIC SPRING

Famous Swiss Truck Manufacturer To Use "Membraneous" Device—Features That Characterize the Contrivance.

Nine times out of ten, before anything in the way of an innovation, or any apparatus verging on the radical, is incorporated into the design of the products of a reputable motor vehicle manufacturer, the article must have undergone many and severe tests, lasting over a prolonged period, in order to satisfy the producers that a change would prove of benefit. Abroad the large manufacturers are, as a rule, even more conservative than is the case in this country, so that no little interest attaches to a device which has been



SAURER'S "MEMBRANOUS" AIR-SPRING

proved to possess sufficient merit to be adopted as standard equipment on the trucks of Adolph Saurer, the famous Swiss manufacturer. The device in question is an air spring, and according to foreign prints the makers, Alfred Joel & Co., Zurich, Switzerland, just have closed a contract with the Saurer interests whereby the springs will be supplied on Saurer trucks.

The Hoffman air spring, as the device is termed, is simple in design. Between the two sections of a split chamber, a composition membrane is bolted. The rod (B), which bears a headpiece (C) and a guiding cylinder (E), passing through the bearing (D), is attached to the axle of the car by means of the recessed saddle (A). The lower section of the split chamber is bolted to the cross member of the car frame (F). Air is compressed in the chamber above the diaphram so that the latter fits snugly about the headpiece. The jars encountered by the machine when in operation cause movement of the rod and headpiece and further compression of the air above the membrane and thus the jar is cushioned before it reaches the frame. The shape of the headpiece prevents the membrane from being bent at angles which are so sharp as to cause cracking, and longevity is the result. The passage (G) leads to a connecting compression chamber, and the flow of the air from one chamber to the other through the constricted passage, it is claimed by the manufacturer, tends to damp out the oscillations of the spring; sidesway is prevented by the cylinder and bearing.

Ball Bearing That Takes Thrust Load.

One of the disadvantages of the ordinary type of annular ball bearing is that its construction is such that, except within



"DUPLEX" COMBINATION BEARING

very narrow limits, it is incapable of absorbing thrust as well as radial load. Even those few manufacturers who state that their bearings may be run with safety under a slight thrust load advise against the proceeding and it generally is considered to be harmful. It attempting to overcome this difficulty, the Duplex & General Bearing Co., which is a British firm with headquarters at 230 Euston Road, London, S. W., has evolved a new type of bearing which is quite different from anything else of its kind that has put in an appearance up to the present time, and which is claimed to be the first and only ball bearing which is capable of taking both full radial and thrust loads. As may be seen by the accompanying sectional drawing, the construction is unique and involves the use of two sets of ball bearings, the larger bearings taking the radial load and the small ones the thrust load. But two races are used, however, the construction being such that the effect of four is obtained.

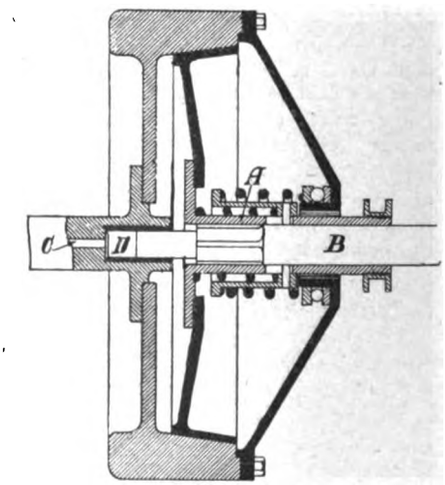
What May Affect Valve Action.

Valve action is in a great measure dependent upon the condition of the spring. If the spring is too weak, or is broken, irregular running is the result, but even when springs are of the correct tension and size, the action of the valve may be affected if the base and top of the spring are not perfectly square with the sides.

HERE'S THE DASHPOT CLUTCH AGAIN

British Inventor Evolves New Design, Using Oil For Control—How it Works and the Ends Attained.

Undeterred by previous unsuccessful attempts to produce a satisfactory clutch in which the action is controlled by a dashpot, S. Bramley Moore, who is a British inventor, just has been allowed a patent, No. 22,553, on a device of this general character that differs from others that have seen the light of day, in that the dashpot effect is obtained hydraulically. The clutch itself is of the cone variety, and as may be seen by the accompanying picture, there is little that is startling or radical in its construction. Similarly, the operation of the clutch is orthodox, except, of course, that its engagement is controlled by the dashpot, which relieves the driver of the responsibility of very carefully removing



DASHPOT CONTROLLED CLUTCH

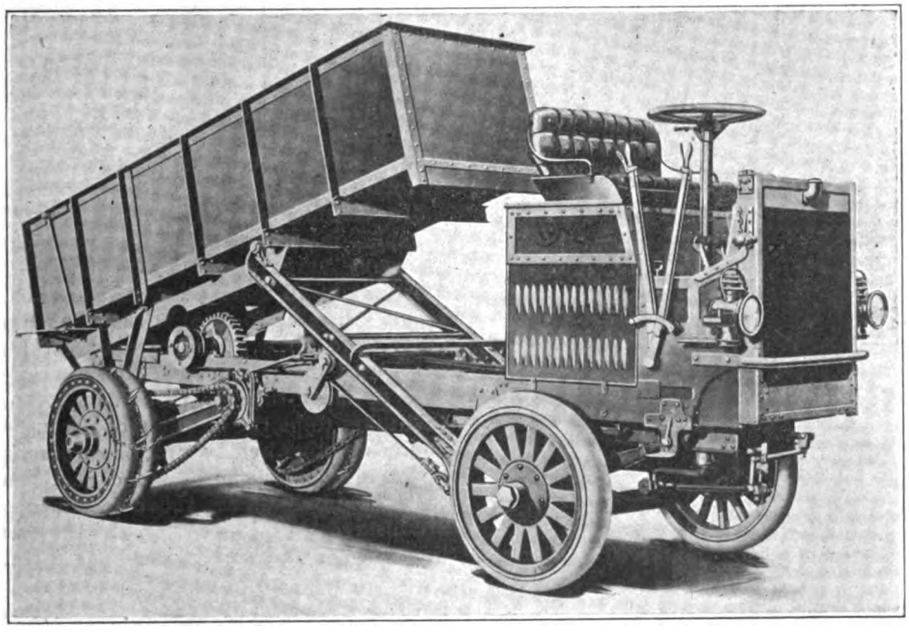
his foot from the clutch pedal in order that the action of the clutch may be "sweet;" the purpose of the dashpot is to cause the clutch to engage smoothly regardless of the abruptness with which the pressure on the clutch pedal is removed. Pressure on the clutch pedal slides a sleeve (A) to the right which compresses both the inner and outer clutch springs and at the same time moves a shaft (B) to the right. This movement permits a small quantity of oil to be drawn through a check valve (C) into a chamber (D). When the clutch pedal is released, the clutch cone moves into engagement, but before it is fully "home" the oil trapped in the chamber (D) forms a cushion which prevents the shaft (B) returning rapidly. There is a small leak in the check valve (C) which permits the oil to leak out slowly and therefore causes the shaft (B) to return to its normal position comparatively slowly, so that gentle clutch engagement is ensured. The supply of oil is drawn from the engine lubricating system.

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GENERAL MOTORS ADDS DUMP CART

Latest Production Is of Simple Construction—Takes Power From Engine and Locks in Any Position.

Results that follow persistent and well-directed effort along given lines never were better illustrated than by the various types of hoisting and dumping bodies that have been developed for motor truck work within the past two or three years. For years hoisting bodies for coal wagons of the horse variety have been practically alike, the differences being so slight that more than a casual inspection is required to detect them. Since motor trucks began to take up the horse's burden, however, not only has the old type of hoisting body been vastly bettered, but there are several different designs that make the old-fashioned affair look like a mere makeshift. One of the most recent of these bodies, and one that, like most motor truck hoisting bodies, is designed to be raised by power taken from the motor, is that of the General Motors Truck Co., of Detroit. This body, which is well shown in the accompanying illustration, is built for both 5-ton and 3-ton trucks.



G. M. C. FIVE-TON AUTOMATIC DUMPING BODY TRUCK

The body is pivoted at the rear end, and the front end is hoisted by steel cables winding on a drum which is worm-driven from the gear-box. The winch is well toward the rear of the chassis, mounted on the main frame, and from it the cables run forward over sheaves and are secured to the ends of a pair of legs which are pivoted to the body a little forward of the middle of its length. As the illustration shows, winding in the cable pulls the legs into an upright position and of course raises the body at the same time. The drive to the winding drum is through a worm and gear of such pitch that the body will remain locked at any height. When the body is down flat, the hoisting legs lie in a horizontal position along the side frames, quite out of the way, the hoisting mechanism is under the body and there is nothing to interfere in any way with the working of the truck. Control is effected from the driver's seat by means of two small levers, which permit any desired rate of operation.

Cash Prizes Offered for Photographs.

Anyone who wants $50 can have it—if he can produce a sufficiently good photograph of a car equipped with Truffault-Hartford shock absorbers. That is to say, the Hartford Suspension Co., of Jersey City, N. J., has offered that sum as a prize for the best photograph of such a car; and, anticipating that there are likely to be other good photographs, twelve Hartford motor car jacks are offered for the twelve "next best" pictures. In addition, there is another set of prizes of similar value—$50 cash and twelve Hartford jacks—offered for photographs of store fronts, windows or counters displaying Hartford products. The contest closes May 15th.

Lozier Hurls a Challenge at Joy.

Because he did not relish the statements made in certain Packard advertisements, H. A. Lozier, president of the Lozier Motor Co., has challenged Henry B. Joy, president of the Packard Motor Co., to a duel—that is, a speed duel between their respective cars. The challenge was contained in a very long letter, which was given broadcast to the press at the same time it was mailed to Mr. Joy. After the Joyful chuckles have subsided, it is believed that putty blowers at 200 yards will be named as weapons, and with no ambulances on the side lines.

FRICTION UNDER THE MICROSCOPE

How Oil Makes Things "Slippery"—What Happens in the Absence of Lubrication—Simple Experimental Test.

While the popular idea that the office of lubricating oil is to make things slippery is right enough as far as it goes, it does not go very far, for there must be some reason why things are made slippery when oiled. And so there is—a very good reason. To look at a piston, for instance, it might be imagined that it was very smooth indeed, with its almost glass-like finish. The fact is, however, that one good look at the surface through a powerful microscope will immediately dispel any such notion. No matter how fine the finish may be, the microscope will show it to be nothing but a series of little ridges.

Put a piston, rough as it really is, into a cylinder, which is in the same condition, and work the piston in the cylinder without oil. The little ridges and mounds will interlock, in their microscopic way, and do their best to prevent the movement of the piston, and they will be torn up and ground to pieces, making a powder that will help to do a lot more grinding and make new ridges, which in their turn will be torn down and converted into powder. This is the process of wear. Apply some lubricating oil, however, and the hollows between the ridges are filled with particles of lubricant and the surfaces made artificially smooth. The surfaces then slide past each other without their irregularities catching, just as the wheels of a wagon would run smoothly over the roughest road if the irregularities were leveled with water and the water frozen. In addition to the furrow-filling process, the oil forms a film which actually separates the two surfaces, so that in reality they do not touch each other at all. This happens because the oil has sufficient body—is sufficiently heavy—to resist the pressure which tends to squeeze it out from between the surfaces. And this explains why a bearing that is too small will wear very rapidly. It has not sufficient area to carry the pressure, and so the pressure on the oil becomes so great that the lubricant is forced out and there occurs actual metal-to-metal contact, followed by the inevitable grinding and cutting of the microscopically rough surfaces.

Without lubrication, any kind of a motor would be an impossibility, but the internal combustion engine is particularly dependent upon its oil. In fact, when the gas engine first came into existence there was no oil suitable for its use, and special lubricants had to be developed for the special requirements of the new motor. It was quite a long time before it was found that mineral oils only would stand the tremendous heat without either burning up, car-

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bonizing excessively, gumming or becoming so thinned by the heat as to have no body or viscosity.

The principle of lubrication may be exemplified by rubbing a little oil between the thumb and finger. As long as there is a good film of oil the two surfaces will slide easily, but by rubbing hard until the oil is forced out, the breakage of the film will permit actual contact, which can instantly be detected by the greatly increased friction.

College That Teaches Truck Designing.

It is by no means uncommon for colleges which make a specialty of engineering courses to include special instruction in gasolene motor design and construction, but the Rensselaer Polytechnic Institute, of Troy, N. Y., probably is the first to establish a comprehensive course in motor truck designing with a view to fitting its graduates for commercial vehicle engineering as a specialty. The work is taken up by the senior class, and is carried out, as nearly as possible, along the lines of actual practice under the direction of Robert L. Streeter, M. E., assistant professor of mechanical engineering.

The foundation of the course is laid during the first part of the senior year, when the internal combustion motor is taken up in the regular course. During the second term of the senior year the work is extended to include the entire truck from the ground up. The subject is laid before the students in the form of a problem; a given load is to be carried by the truck to be designed, and the load is to be carried over roads the character and maximum grade of which are taken into account. Each student is given a different part of the whole problem to work out, and after determining the type of driving mechanism that is to be employed, the weight of the car is estimated, the efficiency of the mechanism worked out and the horsepower required to drive the car under the most unfavorable conditions is figured.

With this as the groundwork the power transmitting system is designed in detail, the clutch, universal joints, shafts, gears and differential being proportioned to carry the maximum power the motor is supposed to be capable of delivering. Considerations of loading conditions and power application are taken into account in working out the axles, spring and frame, and the complete design is worked up from sketches which are transferred to the drawing board; complete detail and assembly drawings are made, so that when the course is finished there is a complete set of working drawings for a truck from which a working vehicle actually could be constructed.

Instruction from text books is supplemented by lectures which are illustrated by slides made from photographs of parts furnished for the purpose by manufacturers of trucks and pleasure cars. The lectures include also such allied subjects as shop practice with particular reference to motor car work, and the handling of modern alloy steels and other metals.

Locking the Gasolene at the Dash.

What appears to be a new idea in devices for preventing the use of motor cars by persons whose intentions are not wholly honorable, is embodied in the "Gasolock," which just has been brought out by the Auto Lock and Specialty Co., of Detroit, Mich. The accompanying illustration shows the form of the lock, but does not bring out its special feature, which is that it is operated from the dash. There are locks acting upon the ignition system that



THE GASOLOCK.

are operated from the dash, and there are others that act upon the supply of gasolene; but this one operates by shutting off the fuel and the shutting off is done from the dash.

The operating part of the "Gasolock" consists of a Yale lock on the dash, connection with the valve in the gasolene line being made through a polished brass pipe. When the gasolene is to be shut off it is not necessary to use the key; turning a button on the face of the lock closes the valve and the lock acts automatically. The key, of course, is required to turn on the supply again. The small quantity of gasolene in the carburetter and part of the pipe is not sufficient to permit the car to be driven very far, if, indeed, it succeeds in getting beyond the starting stage.

"Insurance Policy" Covering Inner Tubes.

Insurance, like almost everything else, has been so highly specialized that it now is possible to insure a motor car against almost anything that can happen to it and against almost any damage it may inflict on anything else. The next step seems to be the specialization of specialties, and a rather striking example of this is to be found in the plan recently inaugurated by one of the large jobbing concerns on the Pacific coast, the Weinstock-Nichols Co., of San Francisco, Cal., which handles the G & J account.

Briefly, the idea is to insure only the inner tubes of tires, the "policy," which costs $6, entitling the holder to the repair of an unlimited number of punctures or blowouts of a repairable nature during the term of the "policy" which is one year. A policy covers the four tubes of one car only, and of course is not applicable to more than one car at a time. Obviously a man who has a lot of hard luck with his tires will come out considerably ahead of the game, while the "insurance people" will win in the case of a lucky driver or a very careful one. In any case the "insurance business" is a clever advertising idea. The details are covered in the form of contract issued, which is as follows:

"In consideration of the sum of $6.00, payable in advance, Weinstock-Nichols Company agree to repair punctures and blowouts in all inner tubes that are within repair, delivered to them at their San Francisco store for a period of one year from date, used on .....car, Number ..... Size of inner tube or tubes..... said tubes to be the property of the insured and of no other person, firm or corporation.

"It is expressly understood that inner tubes used only on the above described car, are insured by this contract. In the event, however, of the insured desiring to have this contract apply to any other car owned by him—in lieu of the above described car, Weinstock-Nichols Co. must be notified in writing, or, in the event of ceasing to own a car, the insured shall be entitled to a return of the premium at the rate of 50 cents per month for the unexpired term. This contract in any event, does not apply to more than one car.

"It is further understood that this contract does not cover repairs or replacements on valves or valve bases."

When Water May Affect Spark Plugs.

When a motor refuses to start in very damp, chilly weather the reason sometimes may be found in an accumulation of water on the points of the spark plugs. If the plugs are removed, thoroughly dried and replaced the motor should start, if nothing else is wrong. In extreme cases it may be necessary to warm the plugs. This is a form of trouble that is more often found in boats than motor cars, but the same principle holds good in both cases.

Switzerland's Exports Nearly Doubled.

During the year 1911 Switzerland's exports of automobiles increased from $1,380,000 to $2,260,000; its imports advanced in almost corresponding proportion, from $965,000 to $1,653,000.

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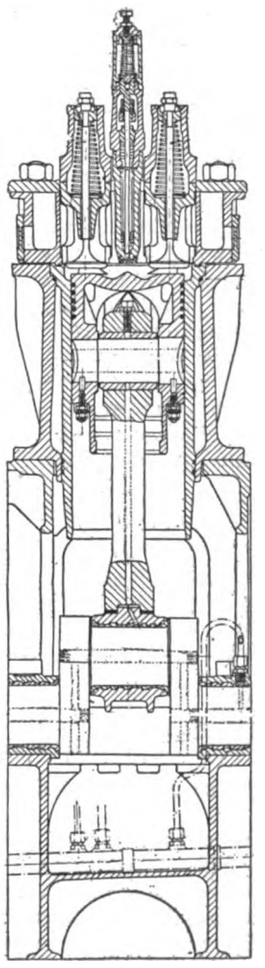
THE DIESEL ENGINE AND ITS APPEAL TO ENGINEERS

Characteristics of the Newest Type of Prime Mover That Make Plain Its Desirability for Road Vehicle Propulsion—Why Its Ultimate Development for Such Work Is Not Only Possible But Imminent—Theory and Practice Laid Bare.

That the Diesel type of internal combustion engine for the propulsion of road vehicles now is certain, Dr. Rudolph Diesel himself having said so, engineers all over the world have been given something more substantial than mere vaporings on which to base their hopes for future development, and popular interest in this unique type of prime mover grows apace. As it stands at present, there remains only the serious business of refining existing designs—a business that may expected to have reached a definite end ere two winters have passed, if the assertions of the inventor and the opinions of a vast number of gas engine experts can be relied upon—when Diesel-engined commercial vehicles, at least, will roll over the roads, and, it is hoped, materially advance motor traction and place it on an even higher plane than it now occupies. And all this, despite the prevailing opinion that Dr. Diesel's invention is unsuitable except for stationary work.

It is safe to say that ever since the engine first became a commercial possibility automobile engineers have viewed it with longing. Almost immediately after the invention had been developed to the stage where experimental engines actually ran, and, incidentally proved the correctness of the theory around which they were built, an automobile engine was built. That was in 1899. As indicating the interest that the engine engendered in the breasts of automobile engineers even at that early date, suffice it to say that only two years before, or in 1897, the invention first saw the light of day. Since then, comparatively little has been heard of the possibility of applying the motor to automobiles. Though it has been a matter of common knowledge that Dr. Diesel has for a long time been experimenting with a view to perfecting an automobile motor, practically nothing has been divulged regarding the progress that has been made. Dr. Diesel is inclined to be reticent when the subject is broached and little information is vouchsafed by either the Busch-Sulzer Bros.-Diesel Engine Co., of St. Louis, which is the parent company, or by the various foreign companies operating under license to build the engines. Dr. Diesel has had under test in Germany, where all his experimental work is carried on, a four-cylinder 30-horsepower, high-speed engine and it is on the showing made by this engine that hope for the almost immediate perfection of automobile engines operating on the Diesel principle is based.

And there are excellent reasons why all automobile engineers and gas engine experts should cast longing eyes on the Diesel engine. It marks a distinct advance in internal combustion engine practice and first and foremost it permits of obtaining greater actual thermal and mechanical efficiency than any other known type of prime



DIESEL CYLINDER IN SECTION

mover. What is more to the point—probably the most remarkable feature of the engine—this exceptional thermal efficiency is obtained by the use of crude products, obviously cheap, and by-products which hitherto have been considered practically worthless unless they were passed through more or less expensive processes. In fact, there is little reason why the Diesel engine for small power work, as in automobiles, should not be viewed with longing. Even though its economy of operation, which is one of its principal features, may not constitute sufficient inducement at present, in view of the fact that the cost of fuel in present engines is but a drop in the bucket of total maintenance cost as measured by depreciation and particularly tire costs, what the future may bring forth no man can tell. At least it seems that if fuel cost were still further reduced—it is doubtful if a cut of sufficient size to be visible without the aid of elaborate statistics could be made by any other means than the utilization of Dr. Diesel's invention—no little stimulus would be given the movement to reduce other costs and the industry would be placed on an even firmer base than it is at the present time.

It was early in 1893 that the first Diesel engine took concrete form, though as Dr. Diesel naively remarked to an audience in New York last week, it never ran under its own power—"not even a single revolution," to quote the inventor. Another engine was built, with the faults of the first in view, but even that engine disappointed its builder by remaining in a state of perfect quiescence. Four years later, in 1897, after more than twice four years constant labor, there was set up in Germany at the Augsberg works of the company the first perfected Diesel engine. It not only ran under its own power, but it attracted attention far and near and engineers from all over the world foregathered to examine it. The opinion was expressed that the engine gave better heat utilization than any other known type of heat engine. Since then the engine has been brought to a still higher state of perfection and it continues to exact the homage paid the first of the type to run and to generate power. Long since, the original basic patents under which the engine is manufactured have expired, but its production is based on so many other patents covering improvements and it is so difficult to find new methods of attaining results that are covered by the patent specifications that most manufacturers have purchased their experience from older manufacturers in the form of licenses. Still, considering the genuine value of the engine, comparatively few manufacturers have essayed its production, the reason being that a certain amount of experimentation still is necessary and inordinate care in construction is absolutely essential to insure efficient operation.

When the first patents were issued to Dr. Diesel, the invention had the distinction of being among the very few inventions of

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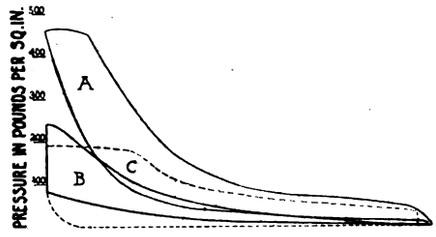
modern times that were constructed from a theory that had been deduced beforehand. In other words, the engine was not built and the theory afterward applied to it—and as is the case with not a few other inventions, made to fit. Dr. Diesel first evolved the theory and having laid down the working principles on paper proceeded to construct the engine. The success of the sequence of operations is attested by the thousands of Diesel engines that are converting heat into power today in almost every corner of the world.

The theory upon which Dr. Diesel operated is beautifully simple in imagination, though it is by no means as simple to put into practice. It is comparatively well known that when air is compressed a certain amount of heat is given off. A simple example of the hypothesis may be found in the ordinary tire pump. Also, both theory and practice show that for the greatest internal combustion engine efficiency the greatest possible compression should be used. These are the two principal factors around which the Diesel engine is built. The greater the degree to which air is compressed the greater will be the amount of heat generated—within certain limits, of course.

For instance, if the temperature of air at atmospheric pressure is 60 degrees, then compression to 100 pounds pressure will raise the temperature to 490 degrees and compression to 500 pounds will raise the temperature to approximately 1,000 degrees Fahr. This assumes, of course, that no heat is transferred from the air to the compressing apparatus and the curve which illustrates this law is styled an adiabatic curve. The isothermal curve represents the condition under which all the heat generated is conducted away. The actual Diesel compression curve follows closely the adiabatic curve, but comes between it and the isothermal curve. It is considerably closer to the adiabatic curve, however, than is the compression curve of the ordinary internal combustion engine.

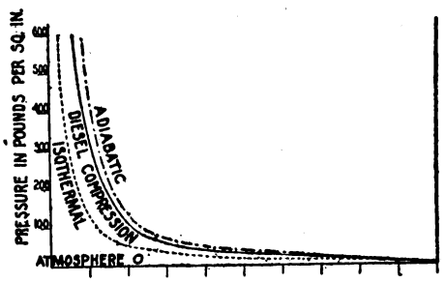
It was Dr. Diesel's object to increase the thermal efficiency of internal combustion engines by materially increasing the compression pressures allowable. Obviously, as air is compressed its temperature is raised, and if it is compressed sufficiently to permit of a substantial increase in thermal efficiency, its temperature will exceed the flash point of any fuel which may be mixed with it. This was one of the difficulties with which the inventor had to labor and it was overcome by the simple expedient of compressing only pure air. Thus, no matter how great the compression may be there can be no preignition because no fuel is present. After compression is complete, the fuel is injected under pressure and is burned by the heat generated by the compression without recourse to other ignition methods.

Without going deeply into the matter, which is hedged about with much that is abstruse and abstract, the underlying principles on which this remarkable engine relies for operation are as follows: (A) The production of the highest temperature during the cycle of operation not by and during combustion, but solely by the compression of pure air; (B) the gradual introduction of a measured quantity of fuel into the compressed and heated air in such a way that no extra heat is generated, but that all the heat is at once carried away by the expansion of the gases of combustion during the working stroke; (C) instead of admitting only such quantity of air as is required for the combustion of the fuel a large quantity in excess is admitted. These are the fundamentals laid down by Dr. Diesel himself in his endeavors to perfect a machine that should as near as is possible in practice, operate on the "Carnot cycle."



COMPARATIVE INDICATOR DIAGRAMS

To go back into the history of the engine, it is interesting to note that as originally designed, it was proposed to use isothermal compression up to 250 atmospheres and it was hoped that auxiliary cooling apparatus in the form of a water jacket could be dispensed with. It was planned to conduct away most of the heat by introducing a quantity of water into the cylinder. It was found, however, that such methods were not practicable and that for practical results it was necessary to deviate from the pure Carnot cycle to the extent of combining two of its stages into one, and, instead of compressing the air in stages, first isothermally and subsequently adiabatically, compressing the air adiabatically in one operation. A water jacket then became necessary as a matter of course.



CHARACTERISTIC COMPRESSION CURVES

Though the operation of the Diesel engine approximates closely the operation of engines of the "Otto" type it is obvious that there are important differences. Thus, in Otto engines combustion takes place at constant volume, whereas the Diesel engine combustion takes place at constant pressure, the cycle of operations being as follows: On the initial, or suction stroke, of the piston, pure air is drawn into the cylinder; on the up stroke the air is compressed to approximately 500 pounds to the square inch; immediately the piston starts downward, on the working stroke, the fuel valve opens and the fuel is sprayed into the heated air; on the succeeding up stroke of the piston the burned gases are exhausted in the usual way.

One of the characteristic features of the engine is that it is not an explosive engine in any sense of the word, as a brief survey of the accompanying indicator diagrams will illustrate; they are drawn to the same scale and represent typical diagrams taken from (A) the Diesel engine (B), the ordinary type of gas engine and (C) the Corliss type of steam engine. In the ordinary type of gas engine the initial compression is comparatively low—about 85 to 90 pounds—and immediately ignition takes place the pressure rises abruptly. Similarly, in the steam engine the pressure behind the piston rises until it approximates the boiler pressure, assuming, of course, that the throttle is wide open, when, as the piston descends, the pressure drops until steam is cut off when it drops more suddenly as the steam expands. During the working stroke of the gas engine, there is more rapid rise of pressure and also more rapid drop in pressure during the working stroke.

In the Diesel engine, however, the pressure line due to compression rises very gradually in an even curve until the limit of compression is reached and ignition takes place, at which point there is a very slight further rise, making plain the fact that there actually is no explosion in the usual sense of the word. It may be seen that the working pressure line—the piston being on the working stroke—falls away comparatively rapidly at first, but that toward the center of the stroke and almost to the end the curve is maintained practically horizontal, indicating that the pressure on the piston is practically constant. This may be explained by the action of the fuel admission valve which is so arranged that fuel is injected not in a lump, so to speak, or all at one time, but the injection is continued for a considerable portion of the stroke. The result is an evenness of torque and a smoothness of operation that is absolutely foreign to any other type of internal combustion engine.

The operation of the Diesel engine depends primarily on its high compression, and though methods of construction vary within fairly wide limits, according to the individual ideas of the manufacturer, there is little actual deviation from the designs as originally laid down. Thus, for instance, poppet valves are used exclusively to control the admission of the air and the exhaust of the burnt gases. It has been found that with reasonable care—care such as naturally would be given a steam plant—there is little difficulty in maintaining the valves gas tight. As a rule, an extra set of exhaust valves is shipped with each engine and it is

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recommended that they put in to use at regular intervals while the others are removed and ground. The air valve seldom if ever gives trouble for the reason that it is seated during the heat of explosion and during the expulsion of the hot gases. In order to obtain the inordinately high compression very small clearance space between the top of the piston and the cylinder head is used, the exact amount being shown in the illustration of a Mirrlees-Diesel cylinder reproduced herewith.

The picture shows quite clearly the usual arrangement of the three valves that are used, the air and exhaust valves being on either side of the fuel injection valve. Both the air and exhaust valves are the ordinary type of mechanically operated poppet valves and are actuated by means of the orthodox cam and rocker-arm arrangement common to ordinary gas and automobile engines. As the compression pressures are raised to upward of 500 pounds it is evident that some provision must be made to inject the fuel into the cylinders and there are two general methods in use. The first is most common and has been used ever since the invention of the engine. It consists of spraying the fuel in by compressed air, the air compressor being operated either as a separate unit operated by a separate engine, or as a unit with and operated by the main engine. In this method the fuel is sprayed through fine gauze and enters the cylinder in a very finely divided state in which conditions it is most readily burned. The second method consists of pumping the fuel in and in this case as in the other the pump may be operated from the main engine or as a separate auxiliary. By either method the fuel is injected under approximately 750 pounds pressure. Governing is effected by proportioning the amount of fuel injected, a favorite method being to compress the fuel in two stages. the first stage pump being of the variable stroke variety and delivering the fuel to the second stage pump in the amount required by the speed and power that is desired of the engine.

Carburation troubles are impossible, of course, for the simple reason that there is no carburetter, the fuel being injected directly into the cylinders in measured quantities. And as no source of ignition other than the heat of compression is required two of the problems which for no inconsiderable time have harrassed engineers, and in many cases still are harassing them, are removed bodily. The real solution of these two problems alone constitutes an advantage which in the eyes of not a few makes the Diesel engine more than ordinarily desirable.

The weight of the existing types of Diesel engines necessarily is high because of the very much higher compressions that are used. To instance the regular type of four-cycle, four-cylinder, 20-horsepower machine: It weighs complete some 1,400 pounds and measures approximately 6 feet in length by 3 feet in height and 2½ feet in width. The bore and stroke are 7 inches and 5 inches, respectively, and the rated power is delivered at about 600 revolutions a minute. By very simple figuring the weight per horsepower works out at 70 pounds, which is very light when it is considered that the larger Diesel engines as used for powers up to 1,000 horsepower per cylinder weigh approximately 110 pounds per horsepower. But these are all very slow speed engines, operating at from 120 to 300 revolutions a minute. By way of reducing weight per horsepower Diesel engines are built to operate on the two-cycle principle and the plant efficiency in terms of weight and engine dimensions is proportionately higher.

The operation of the two-cycle Diesel engine is particularly gratifying. One of the principal difficulties with the ordinary two-cycle engine is to obtain perfect scavenging of the burned gases, which if allowed to remain dilute the incoming charge and so reduce the efficiency of the engine. With the Diesel engine, however, little difficulty in this respect is experienced for the reason that only pure air is compressed and the inrushing air effectually scavenges the cylinder of the burned products. Double-acting two-cycle Diesel engines have been built for some time, and though their plant efficiency still is slightly less than the plant efficiency with a good Otto type gas engine there is reason to believe that before long the conditions will be reversed.

As regards the fuels which may be used, practically the only governing factor is the fluidity of the material. Exceptionally heavy oils and tars cannot be used because they cannot be pumped or sprayed readily. Otherwise, however, almost any hydrocarbon may be employed with good results. Lately, even vegetable oils, such as castor and palm have been used, and though the culmination would seem to have been reached with the utilization of animal oils and fats, experiments have been carried still further and a small engine which was constructed for the French Government was run so successfully on peanut oil that few who witnessed the test were aware of the fuel in use. This particular engine was constructed to use mineral oils and ran successfully on peanut oil and other vegetable oils without any alterations whatsoever, thus giving evidence that the engine undoubtedly is omnivorous in the full sense of the word.

Following is a list of available and unavailable oils, as given by Dr. Diesel in a recent lecture:

1. Normal oils which can always be used:

(A) Mineral oils freed from benzene (gas oils).	Hydrogen over 10 per cent. Calorific power over 10,000 cal. (39,680 B. T. U.). No solid impurities.
(B) Lignite tar oils.	Hydrogen over 10 per cent. Calorific power over 9,700 cal. (38,498 B. T. U.).
(C) Fat oils from vegetable or animal sources, such as earthnut oil, castor oil, fish oils, etc.	Scarcely any researches have been made on these. Earthnut oil has 11.8 per cent. hydrogen and calorific power of 8,600 cal. (34,124 B. T. U.).

2. Oils which can be used only with the aid of special apparatus:

(A) Pit coal-tar oil.
(B) Vertical oven, water gas and oil gas tars, probably also coke-oven tars, the tests on which have not yet been completed. General characteristics: Hydrogen not over 3 per cent.; amount of free carbon not over 3 per cent.; residue on coking not over 3 per cent.; calorific power not under 8,600 cal. (34,124 B. T. U.).

3. Oils which cannot be used:

Tars from horizontal or inclined retorts; it must not be understood that these will not be used in Diesel engines under special conditions; but, on the whole, the above classification is accurate in the present state of development of the Diesel engine.

Of all these fuels it is probable that petroleum residue is most used. At the present state of the market it lists at approximately $9.50 a ton, delivered. It is not possible to compare the cost of such fuel with the fuel that is used for automobile engines, but merely by way of contrast it might be interpolated that for the actual amount of power developed the Diesel engine requires approximately one-fourth the number of heat units that are required with a good steam engine. In other words, to obtain one brake horsepower hour from a steam engine with free exhaust requires 7,000 to 10,000 heat units; the super-heated condensing steam engine and turbine require 4,000 to 7,000 heat units; the gas engine with producer 3,000 to 3,600 heat units; the gas engine without producer, 2,200 to 2,600 heat units; and the Diesel engine 2,300 to 2,600 heat units. All figures are based on the progress which the development of today represents; it is expected that the extraordinary thermal efficiency of the Diesel engine will be still further increased.

Up to the present time the highest thermal efficiency that has been obtained is 48 per cent. This high figure resulted from experiments and in practice the average efficiency is 38 per cent., which is to say that 38 per cent. of the heat value of the fuel is converted into energy within the cylinders. Recent tests of an Atlas-Diesel engine, based upon indicator diagrams showed an actual thermal efficiency of 37½ per cent. The mechanical efficiency was close to 80 per cent., some 11 per cent. going to the air compressor and the remainder being absorbed in friction. The Diesel engine requires approximately one-half pound of fuel per horsepower hour, the following figures representing the average results obtained in a number of large installations abroad and in America:

.51 pounds of fuel per brake horsepower at full load.

.53 pounds of fuel per brake horsepower hour at ¾ load.

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.58 pounds of fuel per brake horsepower hour at ½ load.

.72 pounds of fuel per brake horsepower hour at ¼ load.

All of these figures are for the heavier, slow-speed engines, such as are used for operating brewing machinery, pumps, electric generators, etc., and though the fuel consumption of smaller units is slightly higher there is so little difference that it is practically negligible.

One of the peculiar features of the Diesel engine, and one that is more or less of a disadvantage, is that as the revolutions per minute are increased combustion becomes less perfect. Consequently the power output curve drops. With the ordinary types of internal combustion engine, as every one who is at all familiar with them knows, up to a certain limit the power increases in proportion to the increase in speed. Though this failing of the Diesel engine might perhaps be taken as a detriment that would militate seriously against its use for high speed work, such is not the case, as experiments with the later type of high-speed engines tend to prove. Though it is impossible to run the ordinary type of slow-speed Diesel engine at much over 350 revolutions a minute with any degree of success, the newer engines designed for smaller powers operate perfectly successfully at speeds up to 600 revolutions a minute and it is to these later engines that automobile engineers pin their faith.

And after all is said and done it would seem that there is little real reason why the most sanguine expectations should not be realized. As the weight per horsepower of the Diesel engine undoubtedly is high as compared with the same factor in the ordinary automobile engine, the former being 70 pounds in the case of the four-cylinder, four-cycle, 20-horsepower engine previously described, and the latter being in the neighborhood of 16 or 17 pounds for a well-known type of 50 horsepower commercial vehicle motor, it is meet that it should receive first consideration. It has been said, with a great deal of truth, that it is essential that by reason of the high pressures acting on Diesel engine pistons construction be more rugged. A glance at the accompanying indicator diagrams will show that the pressures are not so high, perhaps, as generally is believed. In the first place it is not an explosion but is rather a gentle push and it has been demonstrated that it is easier to sustain a steady thrust than an abrupt explosion. By way of indicating that the pressures obtained are not excessive, even for automobile engines, it may be interpolated that in a well-known make of steam automobile engine the normal pressure exerted on the pistons is 600 pounds, or over 100 pounds more than the greatest pressure exerted on the pistons of a Diesel engine operating on the usual fuel consisting of petroleum residue. What is more to the point, these steam pressures often are exceeded by as much as 100 per cent. and little difficulty is experienced in maintaining joints and packings gas tight. Neither are the engines excessively heavy. The engines are double acting and compound, of course, which accounts for the high ratio of power to weight.

The figure of 70 pounds to the brake horsepower which has been given applies to a four-cycle engine. As it has been demonstrated that the most successful type of two-cycle engine yet produced is the Diesel engine, it would seem that there are abundant possibilities for weight reduction in this direction. Obviously, a two-cycle engine of, say, 20 horsepower, would be considerably lighter per horsepower than a four-cycle machine, and though the weight of the former might still be considerably in excess of the weight of the usual type of automobile engine, the advances which have been made in the manufacture of Diesel engines within the comparatively short time that they have been produced lead to the conclusion that still further reduction in weight per horsepower is not only possiblt but is a quite probable form of development.

Whether this may be accomplished by reducing the factor of safety, which at present is notoriously high, or whether it will be accomplished by using better materials, remains for the future to bring forth. Probably a combination of the two would be the best solution of the problem. As at present constructed, the Diesel engine undoubtedly is expensive for the simple reason that more careful workmanship than generally is necessary for the usual automobile engine is absolutely essential to its operation. As the engine depends almost entirely for operation on compression, the acme of perfection in the "fit" of parts is necessary, for though a slight slackness in an ordinary gasolene engine scarcely would have a very noticeable effect on efficiency, the same cannot be said of the Diesel engine. Consequently, if still better materials are used—it might occasion a search to find them at present—the cost of the Diesel engine reaches an even higher figure. Still, it would seem that the possibility of obtaining fuel at the rate of approximately one-tenth of a cent a mile would in a large measure overcome the popular prejudice against increasing first cost in the hope of decreasing operation costs. It scarcely could be long before the increased first cost would be more than offset by the lowering of fuel expense.

As regards the added complication of the Diesel engine, it should not be lost sight of that all such engines are self-starting, compressed air stored in a tank being used for the purpose. Compressed air under any pressure is not the easiest thing in the world to control; it is difficult to manufacture joints that will not leak under such vibration as may be expected in a road vehicle, and though it might appear that it would be practically impossible to store air for any considerable periods at as high pressures as 600 pounds, there is the possibility of reducing these pressures by the simple expedient of reducing the necessary compression pressure by using fuel that in specific gravity is between gasolene and the heavier crude oils and distillates. Gasolene can be used in a Diesel engine, as already has been pointed out, though its employment would eliminate one of the principal charms of the engine—its omnivorousness. Similarly, kerosene can be used, and beside the Diesel engine, the ordinary type of kerosene engines pales into insignificance. The heavier kerosenes and distillates might be used and in this way compression pressures, and consequently the necessary (sic) weight, materially reduced.

There is one advantage of the Diesel engine that cannot be either refuted or denied, namely, the volatility of the fuel which may be employed is such that explosion, spontaneous or otherwise, or even burning under ordinary conditions, cannot take place. The risk of fire in the ordinary gasolene-engine vehicle is not as low as it might be, as witness the insurance rates, and even though actual fires are not common occurrences, the hazard remains. With the fuel for a Diesel engine, however, such contingencies are impossible, and it might be added that by reason of the fuel economy—one-half pound to the horsepower hour—a touring radius of at least one-third as much again quite probably could be obtained with the ordinary size tank.

Relation of Piston and Piston Rings.

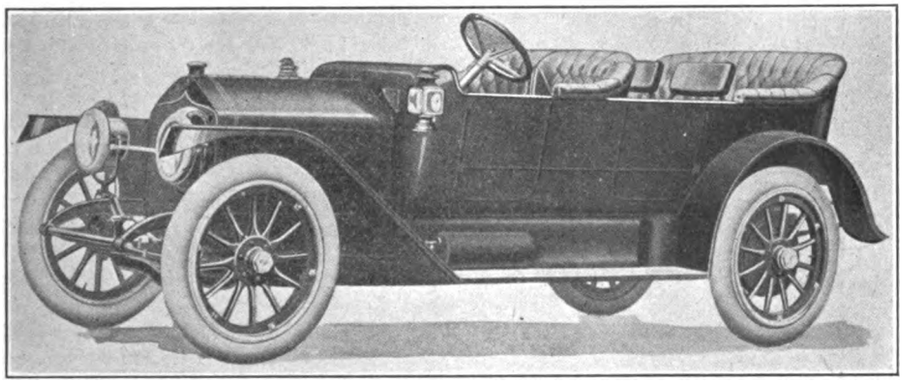
While the fit of a piston in its cylinder is, of course, a matter of importance, a motor will run a good deal better with a badly fitting piston and good rings than with a well fitted piston and poor rings. As a matter of fact, the piston itself acts daily as a guide for the upper end of the connecting rod, having a very large area of bearing surface in order to wear slowly, and the rings are depended upon to prevent the leakage of gas from the combustion chamber. This is very readily proved by the behavior of an engine having a broken piston ring, and if any further proof is needed it can be obtained by trying to run a motor after removing the rings from the piston. It is an impossibility to make a piston that will be a perfect fit in a cylinder under the very trying conditions imposed by the high temperatures attained in gas engine work, which not only cause expansion, but to a certain extent distortion, which is not uniform in the cylinder and piston, and varies in different parts of the cylinder itself. The elasticity of the packing rings provides a means of filling the spaces that otherwise would be left by such unequal expansion and distortion, and allows the piston to be made enough smaller than the cylinder bore to prevent binding when heat generated by the burning gases causes changes of form which, though comparatively minute, are sufficient in many cases to greatly impair the efficiency of the motor.

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NATIONAL EMBRACES LEFT DRIVE

New Series V Cars Also Have Center Control—Engine Made Larger and New Rear System Adopted.

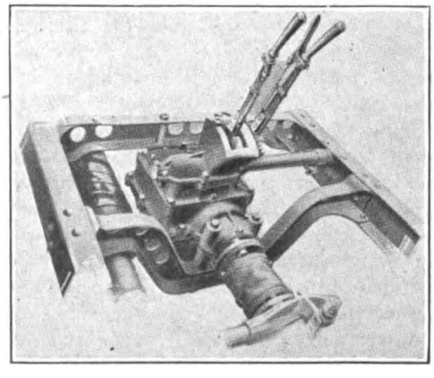
National cars, which have acquired an enviable reputation for consistency and reliability in all sorts of contests under the able guidance of Herrick, Tetzlaff, Herr, Aitken and a few other such national characters—a reputation that they have quite easily lived up to in the hands of less ambitious owner-drivers, whose penchant for speed is subservient to a natural desire for more conservative road use—enter their twelfth season under the plain designation Series V; the crop which immediately preceded them was styled Series S. Though the new cars follow fairly closely the general lines that have marked the products of the National Motor Vehicle Co. in the past, not a few alterations in construction have been made, the most important of which is the adoption of left hand drive with centrally located control levers.



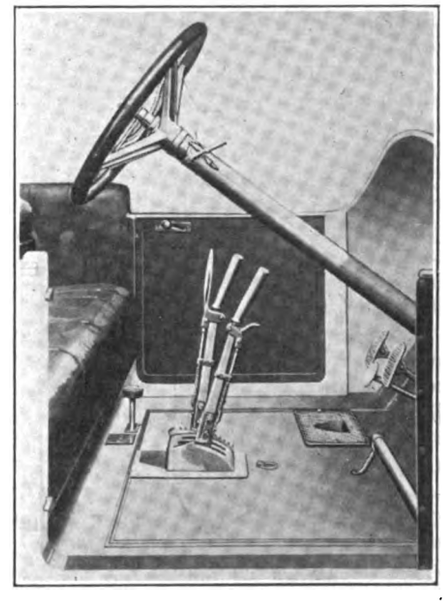
NATIONAL LEFT DRIVE SEVEN-PASSENGER TOURING CAR

As heretofore, but a single chassis is produced, though it is supplied with a variety of body styles, ranging from a two-passenger roadster which lists at $2,750, through small tonneau and five-passenger touring cars at $2,900, and seven-passenger touring car at $3,000, to a clever three-passenger inside driven coupe which lists at $3,250 Bodies in each case are exceptionally roomy and are replete with fitments to increase the comfort of passengers. The upholstery, for instance, has been increased in thickness from five to ten inches, and combined with a spring suspension that has been rendered more than ordinarily flexible by the substitution of longer springs both front and rear, provides easy riding qualities that are excelled by very few other cars. Additional pockets are provided within the tonneau and the driver's compartment for the storage of small tools and accessories and by way of protecting the high finish, the upholstery leather has been continued over the back of the driver's seat up to the robe rail. The pleasing external appearance of the cars, which always has been a characteristic of the line, has been enhanced by lowering the bodies two inches and finishing them off with a new type of mudguard that fits closely over the wheels and blends well with the general straight line effect which is obtained.

As regards the motor and running gear, several important changes from previous practice have been made. Thus, though the motor remains of the distinctive T-head type, with the cylinders cast in pairs, it has been reversed, so to speak, the exhaust valves, manifold and mechanism now coming on the right side, together with the water pump and magneto, and the intake valves and carburetter being on the left side. The change was necessitated by the adoption of left drive and center control. The rating of the motor remains the same, namely, 40 horsepower, though the bore and stroke have been changed from 5 x 5 11/16 to 4⅞ x 6, which, it is explained, permits of an increase in actual power developed of 17 per cent. Little other change in the motor has been made, all the other characteristic features, including the slightly domed and internally ribbed pistons, being retained intact. Ignition in all but the roadsters now is effected by means of a Bosch double distributor magneto and storage battery, instead of two independent systems; in the roadsters a Splitdorf double distributor magneto is used. As stock equipment, a 1¾ inch Schebler carburetter is supplied on all but the roadster, which is fitted with a 2-inch Schebler; a Miller carburetter is optional with the roadster, and a Diezemann with the small tonneau and touring cars. Another slight change which has been made is the enclosure of the valve stems and springs by means of individual coverings, which are readily removable for making adjustments. In place of the riveted-blade fan which has been used in the past, a new one-piece adjustable fan is used, and in conjunction with a new type cellular radiator, which is mounted on trunnions and springs to relieve road jars, forms the cooling system; the water is circulated by means of a centrifugal pump. By way of reducing the manual labor attendant upon the operation of any car, the manufacturers have added a new single cylinder air compressor for inflating tires. It is mounted on the engine base and is driven by means of a small cone clutch from the exhaust cam shaft; it remains idle except when required for use.



NATIONAL GEAR SET SUSPENSION



CONTROL LEVERS AND PEDALS

Changes in the running gear are no less important than engine changes, and embrace the adoption of a brand new rear construction and alterations in the change gear mechanism of such nature as make that part also practically a new unit. Instead of a single universal joint in the propeller shaft, two now are used, one being just aft the change gear case and the other forward of the differential housing. The torsion tube which was used on Series S cars is replaced by a pressed steel torsion member at the left side of the propeller shaft and connected at its forward end to the change gear casing. Similarly, the cast steel differential housing, which was a feature of the earlier cars, has been done away with, and in its place there is a substantial pressed steel casing, which provides more liberal support for the differential mechanism. By reason of the construction of the new housing, a certain amount of frame weaving is allowed for without danger of throwing the gears out of alignment. As heretofore, the driving

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axles are of the full-floating type and rotate on double sets of Timken bearings. Shifting the steering wheel to the left and the control levers to the center of the footboard has necessitated practically a reconstruction of the change gear mechanism. The countershaft now is arranged below the main shaft and is arranged to rotate at considerably slower speed than heretofore. Which, together with the employment of new gears of silico-manganese steel, and complete ball-bearing equipment, has materially decreased the noise which usually emanates from change gear mechanisms when low gears are in use; three speeds forward and one reverse are provided, the control being selective. No change has been made in the clutch, which is of the leather-faced, spring-cushioned variety, and is of large diameter. The brakes also have come in for general revision, and though they still are 16 inches in diameter, internal expanding and external contracting on drums on the rear wheels, they have been increased in width and now are lined with Thermoid instead of the metal lining which was used in the past. The wheelbase of the small tonneau and touring cars has been increased from 124 to 128 inches; the wheelbase of the roadster remains the same —120 inches. In the matter of tires, the seven passenger cars now are equipped with 36 x 5 shoes all around instead of 37 x 4½, and the size of the tires on the small tonneau and five-passenger touring cars has been changed from 36 x 4 to 36 x 4½; on the roadster the tires are 34 x 4½, front and rear. Equipment includes a Prest-O-Starter as a matter of course, and the usual complement of lamps, horn, foot and robe rails, jack, tire irons, demountable rims and two storage batteries.

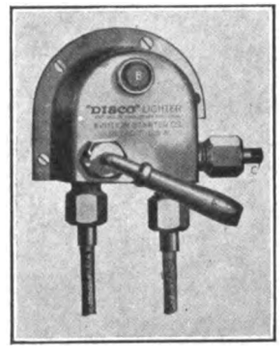
One Cause of Connecting Rod Troubles.

A cause of connecting rod big end trouble that always is exasperating, to say the least, and may seem mysterious to the inexperienced, is the shearing off of the small lugs that sometimes are used to hold die-cast babbit bushings from turning in the rod ends. These lugs usually take the form of round pegs, formed integral with the bushings, which fit into holes drilled for the purpose in the rod ends and caps. There is considerable force tending to cause the bushings to rotate with the crankpins, and it sometimes happens that this force is sufficient to overcome the shearing strength of the soft metal. When this comes to pass, the bushing commences to work around in the rod and soon gets out of line, and, as a rule, either overheats and melts, or breaks up, or both. Examination will show the holes plugged with the sheared-off lug ends. One remedy for this trouble is to cut off the lugs on the new bushing, drill holes of the same diameter as the plugs where the plugs formerly were, and put in short pieces of brass rod, half in the bushing and half in the holes in the rod ends and caps. These will stand the shearing strain, but they must be a good, close fit, so there will be no tendency to move on the part of the bushing.

And Now the Disco Lamp Lighter.

Having brought the Disco motor starter to a high state of development and introduced it widely, it seems almost a matter of course that the Ignition Starter Co., of Detroit, maker of the Disco, should have turned its attention to electric lighters for acetylene lamps and produced the Disco lighter, which just has been placed on the market. It is made under the Barger patent, No. 942,995, granted in 1909 and owned by the Inst Lighter Co., of Columbus, Ohio, though it will not supplant the device manufactured by the owners of the patent.

The Disco lighter is of the jump spark



type, employing a vibrator coil to step up the primary current from the battery which supplies the current. Special burners, with the built-in sparking points, form part of the lighter equpiment. The controller for both gas and current is placed on the dash, or in any other convenient place, for that matter, and consist of a bronze casing enclosing a push-button, a needle valve which limits the maximum flow of gas and a service valve which is used to turn on, shut off and regulate the gas for the lamps. Gas is piped direct from the acetylene tank to the needle valve in the controller, the line being of extremely strong tubing, tested to a pressure of 2,000 pounds to the square inch, and the high pressure joints used, but two in number, are of special construction, designed to easily withstand the tank pressure. The gas passes first through the needle valve and then through the service valve; the needle valve is so set that when the service valve is fully opened the lamps will burn with maximum brilliance. Thereafter when lighting up it is necessary only to open the service valve wide and then push the button, when the gas flows directly over the sparking points and is instantly ignited. In attaching the special burners the only tool needed is a pair of pliers.

The Exact Meaning of "Piston Speed."

Just what is meant by the term "piston speed" frequently is not understood, though as a matter of fact there is nothing about it that is in the least complicated or difficult of comprehension. Piston speed is the average lineal rate of travel of the piston, and is expressed in terms of feet per minute. Of course the piston speed during a single stroke varies from zero to maximum and back again to zero as the piston stops at the end of a stroke, accelerates until it reaches maximum speed at half stroke and diminishes its speed until it again stops before the return stroke. Therefore it is necessary to take the average speed. For a simple example, take a motor having a stroke of six inches running at 500 revolutions per minute. The piston travels six inches each stroke, and as there are two strokes to each revolution, it travels twelve inches per revolution, and this, multiplied by the number of revolutions, gives the distance in inches the piston travels in one minute; divided by 12 this gives 500 feet. The piston speed of such an engine, therefore, is 500 feet per minute. All that is necessary is to double the stroke in inches, multiply by the number of revolutions per minute and divide by 12.

Making Short Wick Serve in Emergency.

It generally is the case that the adage "out of sight out of mind," is applicable to many of the concealed or partially concealed parts of the machine, and renewals and readjustments are left until the last minute or until they become imperative. This is oftentimes the case with the wicks of the oil lamps, with the result of a failure of one or the other of these most necessary adjuncts at a time when it scarcely can be spared. If a slight quantity of oil is left in the container, and the failure is due simply to the "scarcity" of wick, the level of the which the oil will float. In this way the by adding a small amount of water, on entire quantity of oil in the lamp may be utilized, even though the wick be very short.

To Close Fissures in Water Jackets.

A fissure in a water jacket, if it is not too large, can be sealed in a very satisfactory manner by "soldering." Scrape the paint and rust from the surface and chemically clean the area around the fissure with a solution of sulphuric acid and water, finishing the cleansing process with applications of warm water. Paint the fissure several times with a saturated solution of copper sulphate in water until a thin deposit of copper covers the spot. Wash again with water and tin and solder with ordinary soft solder.

To Assure Freedom of Valve Movement.

When occasion arises for the removal of valves, the opportunity should be taken to clean the stems and guides, which may be more or less gummed with ancient oil. Freedom of valve movement is of extreme importance, and for this reason neither the cleaning nor the lubrication of the stems and guides should be neglected. The occasional use of a little kerosene will prevent gummy accumulations, but care should be taken not to allow the kerosene to wash out all of the oil and thereby leave the surfaces dry.

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A STUDY IN SECOND HAND CARS

From a Decrepit Steamer To a Real Motor Car—Price, Little Cash, But Lots of Labor.

"Anyone who wants a good car," said the man who owned one, "ought to be able to get it, if he wants it badly enough and is willing to do some hard work and isn't too particular. That's what I did. Heaven knows," he added, with a grin, "I never in my life had enough money all at one time to buy a car like the one I'm driving, but I certainly did want a machine, and I got it. Sure, I'll tell you the yarn." And he told it. The story begins with a cash capital of $150 and ends—well, the way it ought to end.

Mr. Blank's business made it necessary for him to do a good deal of running around the city and suburbs, and he used a bicycle. The necessity for carrying some rather heavy stuff made this pretty hard work, however, and there were many cases where the trolley cars did not serve; moreover, a more convenient method of transportation would offer a means of considerably enlarging the scope of the business. Blank often looked longingly at the motor cars that were then coming into their own, but all he knew about them was that they cost a deuce of a lot of money. But the idea implanted itself in his mind that the right thing for him was a motor car. That was as far as the matter went for some time.

One day Blank happened to notice in the columns of a newspaper a number of advertisements of second-hand cars for sale, and much to his surprise, he saw that some of these machines were priced as low as $125. He was the possessor of just $150. He lost little time in making a call at the second-hand car salesroom, and was shown a number of cars of different makes. It proved to be a fact that the prices ranged from $125 upward; but all the low-priced machines were steamers. Upon learning that low price was an object—to state the case mildly—the astute salesman imparted to Blank his own private opinion that a steam car was really the best thing on wheels—smooth-running, noiseless, easy on tires and so on—but that people were getting crazy over gas cars because they were the fashion, which kept prices up. And so forth and so on.

"Now look at this machine," said the salesman, pointing out a really good-looking steam car. "There's hardly a scratch on the paint, and you can see for yourself that there's nothing wrong with the machinery." Blank looked under the flap that hung down in front of the seat and he certainly saw for himself, but what his eyes took in did not convey any particular meaning to his brain. He didn't see anything broken, and it all looked clean and neat, though there were a good many pipes and valves and things and the general appearance was one of complication. "And you"—the salesman laid emphasis on the pronoun—"you can have it, just as it stands, for $150."

Blank surrendered, inwardly; but he only said: "How do I know the thing will even run?"

"That's simple. We'll send a man to take you home in the machine and if it doesn't tickle you to death, come and get your money back."

Next day Blank cleaned out his bank account and took the afternoon off to take the car home and learn how to run it. Steam was up when he arrived at the salesroom, and no time was lost in getting started. The car certainly ran beautifully, and the only thing that Blank questioned was the constant labor performed by the driver in working a small handle up and down, especially on the hills. "The pump's new and a little stiff," explained the driver. "The boss told me to keep it going so as to ease it up and save you the trouble of doing it later."

Home was reached without incident and Blank was left with his new possession, an instruction book and a jumbled recollection of a lot of things the driver had told him.

To make a long story short, he fired up next morning, went out for a trial spin, and five miles from home the boiler ran dry and was burned out. Afterwards Blank discovered that the automatic pump wasn't working and that the driver's solicitude was really prompted by the necessity for keeping the boiler supplied with water by means of the hand pump. Appeal to the second-hand dealers was regarded by them as a grand joke. Blank had signed a receipt in which he expressed satisfaction with the car; he had not signed it until he had been driven home, so that he had ample opportunity for observation. The dealers knew nothing about anything being wrong, and the driver was not within reach—in fact he was out of town. However, they could put in a new boiler and repair the pump, which Blank in his ignorance probably had broken, for about $130. Of course, it would cost something to tow the car in, and there probably would be other little repairs to make owing to Mr. Blank's evident neglect to follow instructions, but the whole bill couldn't be more than $200 at the outside.

Blank made up his mind on the spot that he never again would be the victim of his own ignorance, and he spent all his spare time for the next two months in minutely examining the machine and finding out how it worked and all about it. And he spent several more months in saving up the $150 it needed to put the car in good running order. It was during the next summer that he found out why that particular car was sold at a price that would have been ample even if it had been in the best of shape, for it give no end of trouble; its little joints leaked, its toy bearings gave trouble, its miniature pipes shook apart, and it was usual to stop several times in a half day's run to make repairs and minor adjustments.

While the second-hand car people grinned and went on selling steamers—the prices went down to $75 and $100—Blank watched the advertising columns and finally got into communication with a flour-mill engineer who knew all about steam and loved it, and who had a little gasolene car and hated it—not because it wasn't a good car but because he loved steam. So after much correspondence a trade was effected. After that each man wrote one letter to the other, reciting his opinion of him and his machine.

The gas car was a little one-lunger that wheezed and snorted alarmingly, but it had no boiler to burn out and no fire to be extinguished unexpectedly or to be spread all over the back of the seat by a gust of wind. Blank found out all about the machine before he attempted to run it, and, by this time being a fairly expert mechanic, he did a lot of small repair work that was badly needed. He spent the greater part of one winter fixing the car, operated it with a good deal of satisfaction the next summer, put it in fine shape the following winter, and in the spring sold it for $250, which he at once invested in another machine of the same type, but of a later model, and also in a run-down condition. Little time was occupied in turning over this car; it was overhauled in the privacy of the owner's cellar and put in fine condition and about the middle of the season sold for $350. Blank went carless for the rest of the summer and kept a tight hold on his cash, and in the fall, when automobiles were selling at their lowest, he bought an old two-cylinder, motor-in-front car of excellent make, with a French motor in it, for $300. The machine really was a good one, but it was sadly in need of adjustment, cleaning and painting, and looked almost like a wreck. A winter's work put the car in good shape for the summer, and after two seasons' use it was traded for a four-cylinder machine that, while showing the effects of neglect, was essentially all right and really a better car than the two-cylinder one. A winter in the good old cellar had the usual result, and in the high-priced spring the car was sold for $500, which was invested, in the fall, for a Packard car that, like its predecessors in Blank's stable, had been abominably treated but was essentially good. This last deal took place in the fall of 1910, and the car, though not one of the latest models, is a fine, smooth-running machine that looks well, does all its owner wants it to and—satisfies him thoroughly. The total cash investment, Blank figures, was the original $150, for though he spent a good deal of money later on, the extra business done with the aid of the machines offset the extra expense, and the labor, of course, was not counted. It took a good many years and much hard work to reach the goal, but, as Blank says, "What does that amount to after the work is all over and I've got the car I wanted?"

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Court Convinced Against His Will.

(Continued from Page 19.)

that when force is exerted upon the bar it tends to move upward.

Evidently both the claims on which complainant relies are for a combination, and in the interpretation of the claimed combination the experts for both parties agree.

The elements of the claims are: (1) A horizontal buffer rod. (2) Lever means attached to said buffer rod, pivoted to the frame of the motor and so arranged that a line drawn from the pivotal support of the lever on the frame to the point where the horizontal buffer rod is attached to the lever is at an angle to the horizontal plane; and (3) A spring put under stress by movement of the lever around its pivotal axis. The seventh claim adds to the elements above given, (4) A support for the spring aforesaid attached to the automobile and in convenient proximity to the lever.

It seems to me that if Sager's patent is valid the defendants are infringers, because they use a device containing all the elements of both claims unless the "lever means" mentioned in the patent in suit are to be confined to the particular class of lever used by Sager. In Sager's lever the fulcrum is between the points of application of resistance and power, whereas in defendant's, said points of application are on the same side of the fulcrum. However narrowly the patent is to be interpreted, I do not think infringement can be avoided merely by varying the class of lever employed to do the very thing complainant has obtained a patent for.

On the question of validity, decision is reached with great hesitation.

The Harroun patent, which appears to me a far simpler and more obvious device than that of Sager, has been quite broadly upheld by Kohlsaat, J. in Turner Brass Works vs. Appliance Mfg. Co. (Decision dated April 5, 1909, and unreported).

In that case it was admitted that all the elements of Harroun's invention were old, and all that the patentee had done was to adapt what had theretofore been applied to many other arts to the automobile art; and the particular merit found in Harroun was that he had provided some satisfactory protection against injuries to the comparatively frail appliances ordinarily located at the forward end of a motor car.

In my opinion Harroun's device is nothing more than the application to motors of the spring bumper long known and used on railway carriages. To be sure, the steam car bumper is intended to protect the car itself from the shocks frequently encountered in traffic, and especially from that of coupling with other cars; while the automobile fender can scarcely be said to afford protection to the motor car itself, because it is too fragile to protect against a violence sufficient to injure the vehicle. Nevertheless, both the spring bumper and Harroun's motor bumper perform, in different degrees, the same mechanical function, and they do it in the same way. I regard the decision cited as a very strong authority for the complainant herein, and as an extreme application of the doctrine that invention may be found in applying to one art a device well known in another.

The justification of this doctrine will always depend upon the remoteness of the two arts from each other. I should not have supposed that a motor car and a railway coach were sufficiently remote to justify the application, but it has in effect been held otherwise.

In this litigation the attention of the Court is especially called to the Patent of Thomas, No. 523,693, which relates to a "safety guard or fender for railway cars, and more especially for electric and cable street railway cars." The patent to Thomas shows a fender which works upon exactly the same principle as does that of Sager, in that when the forward face of the fender strikes an object the fender itself gives by taking up the power of a spring, but it gives downward, instead of upward. In other words, Thomas's fender and Sager's fender are identical mechanical devices except that Thomas rigs his so as to yield downwardly, and Sager turns it upside down so that it yields upwardly.

I think it cannot be doubted that if Thomas had applied his idea to motor cars, Sager could not have claimed invention by turning the appliance upside down and using it also on a motor—any more than this defendant can escape infringement by varying the class of lever employed.

Thus the question here becomes in my opinion identical with that presented to Kohlsaat, J., in the case cited, and the point to be decided is whether the transfer from the street car art to the motor car art of a buffer bar mounted on spring-controlled levers amounts to invention.

It is impossible to add anything on this point to the bald statement that clearly as much invention is shown as was recognized and approved by Kohlsaat, J.

Defendant relies upon Briggs vs. Duell, 93 Fed. Rep., 972, Jones vs. Cyphers, 126 Fed. Rep., 753, and Ransom, etc., Co. vs. United Concrete, etc., Co., 177 Fed. Rep., 413. These cases all find as a fact that some one definite mechanical device, productive of one result, could not be transferred from one art to another and invention found in the transfer. They hardly meet the requirements of the present case—the street car fender might (and I think would) if properly placed, have done everything that the motor car fender does, and would have done it in the same way; but there is a well recognized difference between what a device can be made to accomplish and what it was designed to accomplish; and especially may the distinction be drawn between that which is accomplished without intention and that which is done by intention and patented for the purpose of accomplishing the intent.

It is true that if Thomas, though ignorant of the fact, made a machine capable of doing the work of the Sager device in the same way, Sager's patent cannot be sustained. United States, etc., Co. vs. Beattie, 149 Fed. Rep., at 739. But there is no evidence that the Thomas fender was ever placed on a motor car, or that Thomas ever thought of a motor car as a proper place for it.

It is unquestionably a new use of the pivoted spring-controlled fender to apply and rig it to a motor car.

"If the new use be so nearly analagous to the former one that the applicability of the device to its new use would occur to a person of ordinary mechanical skill, it is only a case of double use." Potts vs. Creager, 155 U. S., at 608.

Thus we are led back to the question originally propounded, though the statement of the question may now be varied—Would it occur to a person of ordinary mechanical skill to turn the street car fender upside down, change its dimensions, material and fittings, and put it on a motor car to protect against slight shock to comparatively fragile articles ordinarily found on an automobile front? It is difficult to say that such a performance does not show as much invention as has been recognized and approved by appellate courts in such cases as Waterbury Buckle Co. vs. Aston, 183 Fed. Rep., 120, and cases there cited.

Ascribing the dignity of invention to such a device as is here in suit is repugnant to me, but respect for the precedent established by Judge Kohlsaat in this very art, and a consideration of the cases above cited leads me to hold that defendant has not shown enough to upset the presumption of invention attaching to the patent, and to grant to complainant the usual decree.

May 3, 1912.

A Short History of Vanadium.

Though vanadium has been known, more or less intimately, since its discovery in 1801 in Mexican lead ore, it is only within the last two decades that its value in steel alloys has been fully recognized and utilized. For a long time after its discovery—when, however, it was not isolated—no use was made of it, and it was not until 66 years after its existence became known that it was put to any use. In 1867 it was used in connection with the manufacture of dyes and inks and as a glazing material in the ceramic industry, according to "American Vanadium Facts," and it was not until 1890 that its usefulness as an alloy was suspected and attempts were made to produce pure metallic vanadium.

The voracious appetite of vanadium for carbon made it extremely difficult to obtain the metal in anything like a nearly pure state, and the best that could be done in 1893 was to produce vanadium with 4.4 per cent. of carbon, in addition to other impurities. Notwithstanding its high melting point, 1,680 degrees Centigrade or 3,056 degrees Fahr., vanadium was found to alloy readily with iron, copper, aluminum, manganese, nickel, chromium, silicon and other metals. Nevertheless, in the first attempts made to alloy vanadium with steel, made in 1896 at the Firminy Steel Works, in France, difficulty was experienced in making the mixture, and out of three attempts only one was a success. The results were such as to indicate conclusively the superiority of the steel made by the new process. From this time on the steel industry gave such attention to the utilization of vanadium that it soon was the subject of innumerable experiments and tests, the result of which was the vanadium steel, which is so familiar as a material for motor car parts.

While vanadium is found in small quantities in a great many minerals in many parts of the world, in most cases the percentage is so exceedingly small as to make its extraction impracticable from a commercial point of view. The extraction of the metal is made difficult by its affinity for carbon, oxygen and nitrogen at high temperatures, and, as a matter of fact, absolutely pure vanadium has not yet been produced, though the admixtures of other substances in the metal obtained by recent processes are not sufficient to prevent, or even interfere very seriously with its use in steel making.

Precautions in Teaching Novices.

While the manipulation of the various levers and devices necessary or convenient on the motor car, is a comparatively simple matter, until one has become so accustomed to the various operations that forethought no longer is necessary in order to release the clutch, shift the gears or apply either set of brakes, a certain amount of uncertainty attends the operation of the car. In order to avoid the chances of accident with a car which is being driven by a novice, the cars which are used for giving road lessons to students in schools, generally are fitted so that a competent driver who is stationed in the seat next to the chauffeur either can release the clutch or apply the brakes simply by depressing extensions which are fitted to the clutch and brake pedals so that they can be operated from the adjoining seat without interfering with the position of the man behind the wheel It is also made impossible for the beginner to shift the gears into the reverse, and this is accomplished by locking the pawl which prevents the change gear lever from entering the reverse slot of the H quadrant.

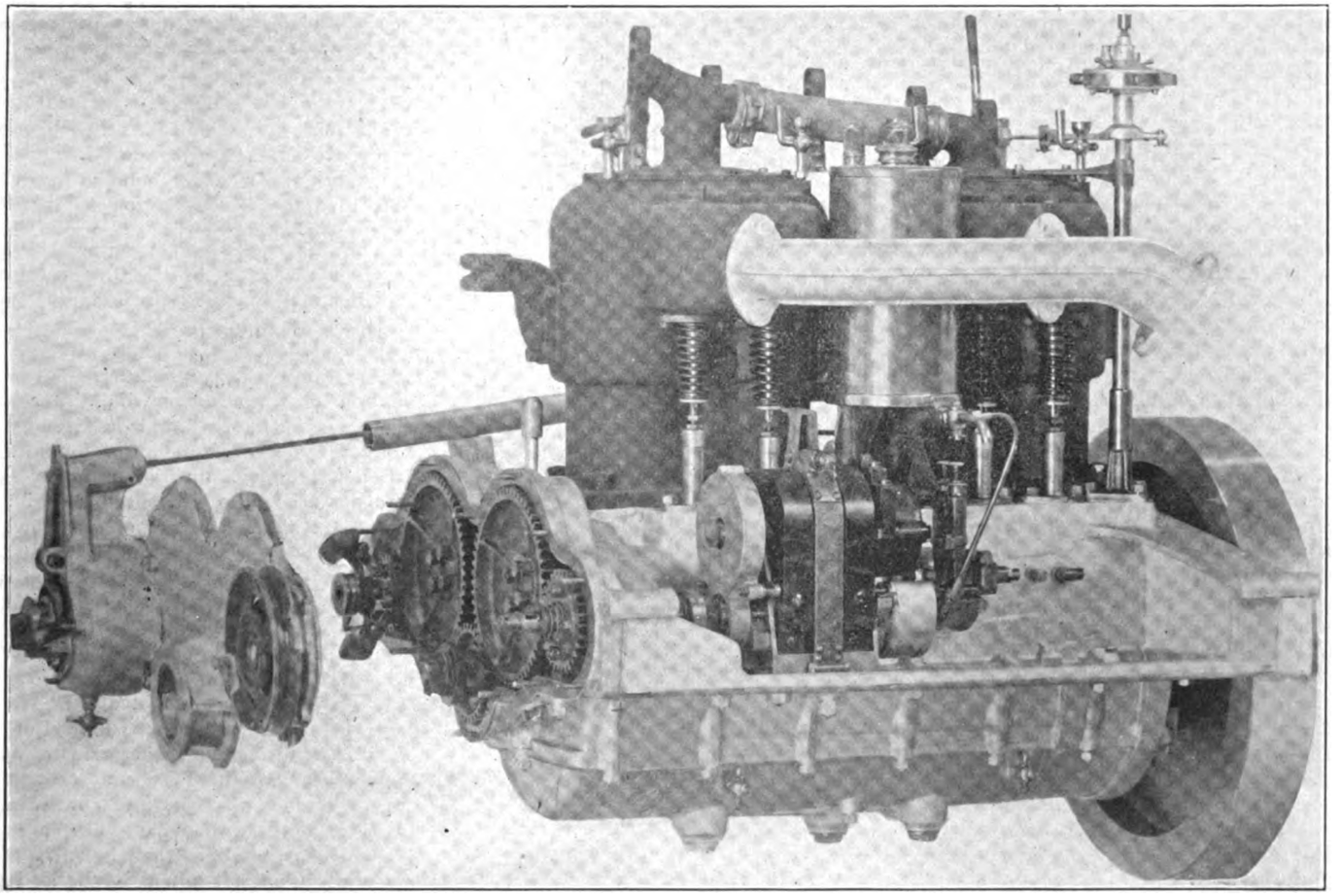
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LIGHT ON BOTH SIDES OF THE GOVERNOR QUESTION

Reasons Why Some Manufacturers Employ the Device and Others Do Not—The Important Part It May Play in Reducing the Maintenance Cost Not Only of Commercial Vehicles But of Pleasure Cars as Well—Pros and Cons of the System.

Professor V. Dwelshauvers-Dery, who is an eminent mechanical engineer, has defined the functions of a governor as applied to a steam engine, and has described the device itself in its most common form, in such clear and concise language that it would be difficult to improve on his phraseology.

"The duty of a steam engine governor," he says, "is, first, to so proportion the expenditure of steam per stroke as to maintain the normal speed constant, whatever the useful load, so long as it remains between zero and the maximum assigned; second, to restore the speed to its normal value when variations have been produced by changes in the load. To effect this the governor is composed of two parts, one a centrifugal apparatus, sensitive to variations in speed and ordinarily called a tachometer; the other an organ which, under the control of the tachometer, proportions the admission of steam per stroke, either by throttling or by varying the degree of expansion. For simplicity let it be supposed that this organ is a throttle valve."



VIEW OF PACKARD TRUCK MOTOR WITH TIMING GEAR CASE REMOVED AND SHOWING GOVERNOR

Which delineation, with but slight modification, applies equally well to the centrifugal governor as commonly used at present on motor trucks. Instead of 'proportioning the expenditure of steam per stroke,' it proportions the amount of fuel drawn into the cylinders and in this manner governs the speed at which the engine runs. In maintaining the speed of the engine constant it prevents excessive speeds, which is its most useful function, in its application to motor trucks, and is its principal raison d'etre.

Like a great many other things which had their birth with the birth of the steam engine, the inception of the governor can be traced back directly to James Watt. Watt had trouble in maintaining the speed of his engines constant regardless of load and steam pressure fluctuations and he invented a fly-ball, or centrifugal, governor which is known to this day as the Watt governor. In the interim between the first appearance of the governor and the present day it is but natural that the construction of the device should have changed materially. The principle remains exactly the same, however, and the Watt governor is in daily use on thousands of steam engines and in all probability on a like number of the various forms of internal combustion motors.

It is not so very many years ago that nearly every automobile that rolled the roads was equipped with a governor of some sort or other. It was not necessarily a centrifugal governor, though that type was, is now, and probably always will be, the most popular; suffice to say that it was a device that governed the speed of the en-

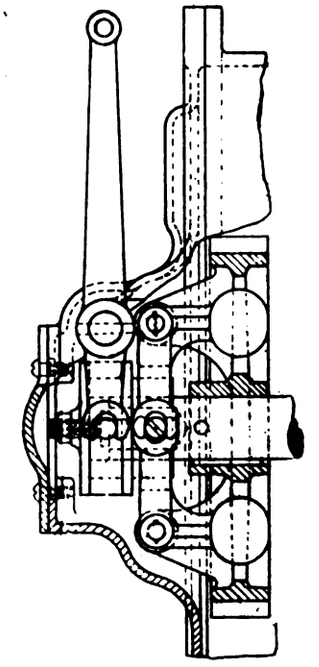
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gine and consequently the speed of the car. Incidentally, a great war was waged between those who advocated the governor on pleasure cars and those who opposed it. It is a matter of history that the "antis" eventually came off victorious and at present the pleasure car that is equipped with a governor is the exception and not the rule. The majority of foreign engineers whose products are destined for the transportation of passengers and not for less animate freight has cast out the governor bodily and there probably is only one American pleasure car manufacturer who still uses it.

Nor is there any great difficulty in fathoming the reason for the practical elimination of the pleasure car governor. As originally applied it prevented the cars from being driven at greater than a certain predetermined speed, which generally was comparatively low. Such limitation of speed scarcely was relished any more then than it is at present and the death knell of the governor was sounded. Still, there is little doubt but what a speed governing device on pleasure cars would serve desirable ends and it is reasonable to suspect that the general adoption of such a device by a majority of the better known manufacturers would be hailed with delight in very many quarters. Not that the average car will not stand up under the hard usuage that excessive speeding entails; it will stand up all right, but it won't stand up for any length of time. Just as is the case with commercial vehicles, a governor on a pleasure car would conduce to car longevity, to lower maintenance cost and to lessened liability to accident. It is safe to say, however, it will be a long time before the motoring public will be content to put up with a speed-limiting governor, for nobody likes to eat dust, and it is so easy to step on the accelerator and make the other fellow eat it—even though it does cost a little more in the end.

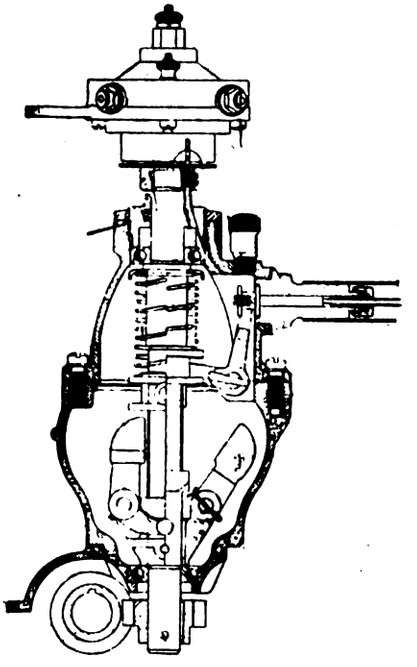
But commercial vehicles constitute quite another proposition. No man operates motor trucks for pleasure. They are put into use for reasons of economy whether that economy results from cheaper cost of transportation or from quicker transportation. Inasmuch as overspeeding has been demonstrated to be one of the greatest, if not the greatest foe to economical operation, it becomes apparent that any device that abates the evil marks an advance in practice, and for this reason should be welcomed with open arms.

Despite this fact the desirability of a governor has been the subject of no little controversy, some engineers holding that it is an unnecessary complication and others pinning their faith to it as the simplest solution of the over-speeding problem. There is no doubt that a governor really does add some slight complication which perhaps might seem incongruous in view of the fact that the tendency constantly is toward greater simplicity. Such complication as is added, however, is so slight as to be negligible, for a well designed governor never requires attention and seldom if ever gets out of order. Nevertheless, the assumption that the governor really does add complication of a sort is the principal



WISCONSIN GOVERNOR

peg on which those who decry its necessity hang their arguments. For instance, it has been held that no governing device is necessary provided only that the driver is a



CONTINENTAL VERTICAL TYPE

good driver and that he is conscientious. But even good, conscientious drivers occasionally are delayed somewhere on the road, and there is nothing that induces a desire for speed more than the prospect of a good supper. So the driver "hits it up" to get home and the truck suffers. The driver may not consciously increase his speed; perhaps he has the best intentions in the world. But the fact remains that he does get all the speed out of the truck he can get and the chances are that quite unconsciously he exceeds the economical limit. Besides, without casting reflections on those drivers who really are conscientious, and who constantly strive for the good of their employers, there are drivers who are good drivers as long as they are under the watchful eye of someone in authority but who scruple not to digress when surveillance is impossible.

If a governor is properly designed and set, it absolutely prevents over-speeding; there is no possibility of the driver hurrying home at a greater speed than has been predetermined to be economical either consciously or unconsciously. Generally it is the driver who requires governing, and where it cannot be effected by moral suasion it must be effected in some other way, and so far the governor has proven most efficacious. To do away with the necessity for an engine governor it has been suggested that the throttle be set at a certain opening that will preclude the possibility of obtaining a greater speed than, say, 12 or 14 miles an hour. In fact, not a few foreign manufacturers use this method of preventing speeding. The buses in the big fleet owned and operated by the London General Omnibus Co., for instance, are not equipped with governors. Their throttles are set so that speeding is impossible. It should be remembered, however, that these buses operate under very nearly ideal conditions, and it is doubtful if such a plan would be productive of such good results if adopted for vehicles that are designed for long cross-country hauls, or even for use in hilly cities.

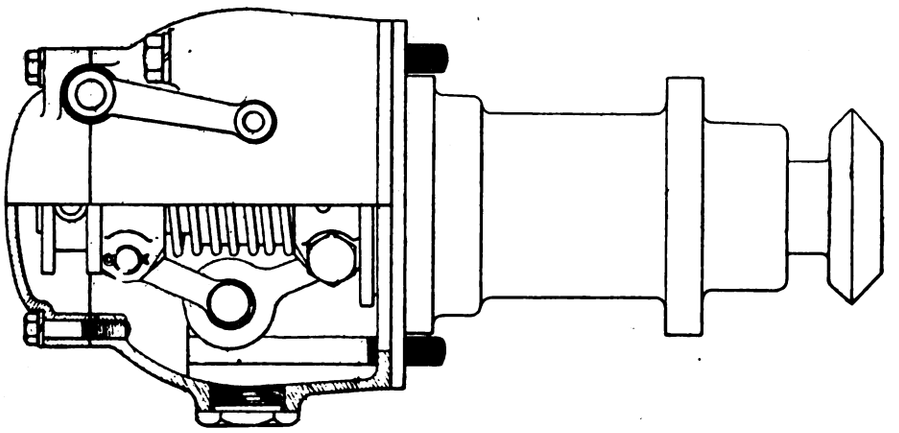
Such a method undoubtedly is efficacious in precluding the possibility of the truck being driven at higher rates of speed than the designers deem economical though it does not take into consideration the fact that any engine will "turn up" faster when it is light than it will when it is loaded, no matter how light the load may be. In other words, the throttle opening that is necessary for maximum power at a certain speed may be, and generally is, sufficient to permit the engine to "race" at destructive speed when the load is removed.

It is in preventing such "racing" of the engine that the governor serves one of its most useful purposes. The fitting of a governor is the only way a manufacturer can prevent this pernicious practice which seems to have fastened itself as a habit on all manner of drivers without distinction. Most engines will stand considerable overload for short periods without serious consequences, but there is nothing that will work greater harm in a short time than racing an engine "light"; such a proceeding almost literally will shake the best engine to pieces.

Obviously, a small engine must run at

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greater speed than a large one in order to do the same amount of work in the same time; a small engine must operate at nearer its maximum economical speed. Though it is more or less generally believed that a governor operates at all speeds, such is not the case. The governor naturally overrides the hand control at high speeds, for that is its purpose. But at lower speeds the hand control governs the speed of the engine. The governor, as used on motor trucks, only comes into operation when the speed of the engine reaches a certain predetermined limit when it operates to close the throttle and prevent greater speed. A good governor provides gas to suit the requirements of the load and restricts the maximum speed at which the truck can be driven. Though the action of a governor may cause a slight drop in speed as the load is taken up it is quickly corrected and acceleration is smoother and more uniform than when no governor is used.

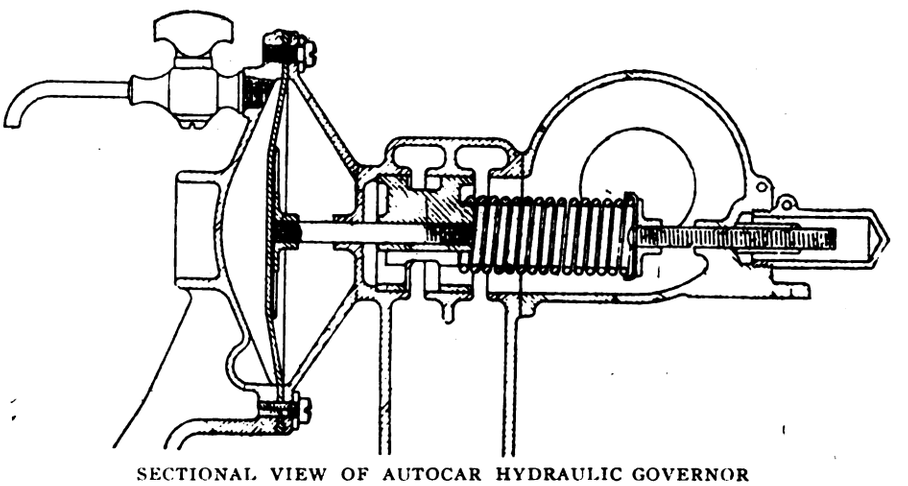


HOW MAIS GOVERNOR IS COMPLETELY ENCASED

There are two general types of governors, one which controls the speed of the engine regardless of load fluctuations, and the other which merely operates to close the throttle when the speed reaches a certain limit. The former is styled an isochronous, or time governor. Perfect isochronism is ideal, but is impossible of attainment, because, as is required for perfection, the centrifugal force does not exactly balance the weight of the balls at all speeds due to the friction in the throttle actuating mechanism. Practical isochronism is realized when the variation in engine speed due to load fluctuations does not exceed two per cent. However, such perfection as is obtained only in the best stationary steam and gas engine practice is not required of motor truck governors. As a general rule isochronism of any sort is not required and reliance is placed on a governor, which merely operates to close the throttle at a certain predetermined speed. In other words, the average truck governor does not become operative, in the sense that it limits the speed of the engine until the predetermined maximum speed has been reached.

As has been previously stated, the fly-ball, or conical pendulum, or Watt governor (the terms are practically synonimous) is by far the most popular, though there are several other types which are in more or less general use. There are several forms of fly-ball governor, the balls in some cases being balls in name only and in form either square, or cylindrical or almost any shape that the designer's fancy may indicate. In any case the action is the same, centrifugal force causing the "balls" to fly outward when they are rotated. As they fly outward, they move a sleeve to which they are attached and thus actuate the throttle lever.

As a general rule, governors of the centrifugal type are operated from the timing shaft. Such an arrangement, as used by the Packard Motor Car Co. on its trucks, is shown by the accompanying illustration, the front half of the timing gear case having been removed to show the governor in its relation to the rest of the engine. The flywheel suggests itself as a likely place for the location of a governor and though it has certain advantages it generally is considered better practice to locate the device within the crank case, if possible, where it is thoroughly protected and lubricated and what is more to the point where it is secure from the attentions of those who might, for reasons best known to themselves, seek to derange its mechanism.



SECTIONAL VIEW OF AUTOCAR HYDRAULIC GOVERNOR

Of the variations in construction which exist in centrifugal governors the accompanying drawings, which have been selected from among the engines of some of the better known manufacturers, are representative. All of them are of the fly-ball type, though, as may be seen, some of the "balls" are not balls at all. In the Wisconsin governor the balls are but the termini of short bell cranks which actuate the sleeve, which, in turn, operates on the throttle lever. The design is conspicuous by reason of the fact that no springs are used to return the balls to their normal position.

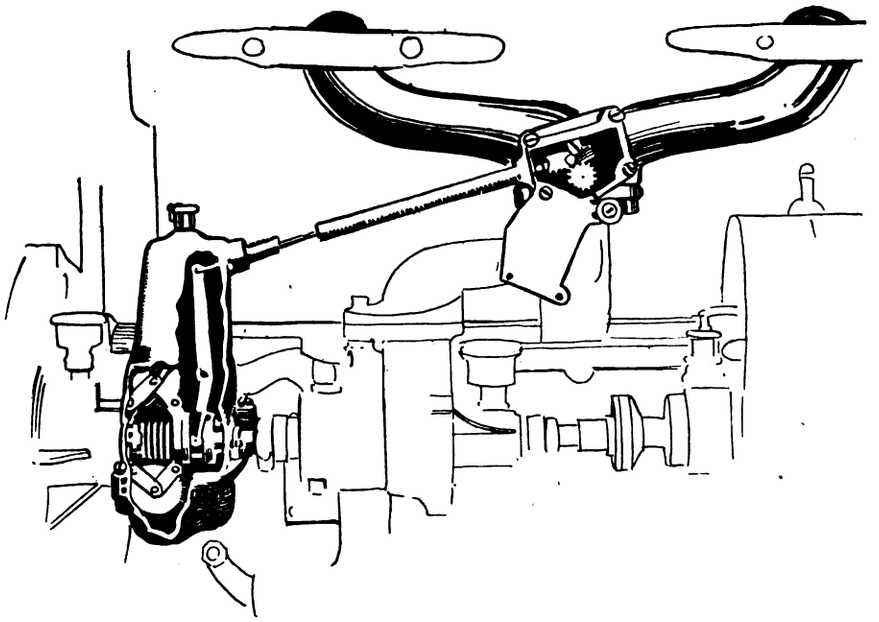
Like the Wisconsin governor, the Continental governor is of the vertical type, though, as may be seen in the picture, its construction is materially different. The balls, in this case, are not balls at all. One of the arms which serves as a ball is shown in the position it would assume if the engine were running at the maximum permissible speed. To return the arms to their normal position (otherwise they would gravitate downward and maintain the throttle closed) a spiral spring which presses on the movable sleeve connected to the throttle mechanism is used. The whole governing mechanism is mounted on the upright timer shaft, the timer being located at the top.

The Peerless governor is quite different from either of the other two, and though it embraces the same essential elements, their arrangement is such that the balls rotate in a vertical instead of a horizontal plane. The balls in this case are held in their normal position (close together, the throttle then being wide open) by means of small spiral springs. Under the action of centrifugal force the balls fly outward and shift a sleeve which is attached to the throttle lever and which encloses the governor driving shaft. As is the case with the other governors the whole mechanism is completely enclosed and is calculated to run for indefinite periods without the slightest attention. The Mais is another centrifugal governor of the same general type, though its construction is different from any of the others. The method of

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operation is illustrated quite clearly in the accompanying picture, which shows half the casing sectioned away so that the insides of the device may be viewed.

The governor which is used on Hazard motors is another of the type in which the balls rotate in a vertical instead of a horizontal plane. The arrangement of the device, which is shown by the accompanying sketch, is typical of the system of throttling by means of a governor, the principle being the same in any case and varying only in the method of arranging the component parts. This particular governor is sealed at the factory and cannot be tampered with unless due notification of the fact is imparted to the owner. By means of an ingenious rack and pinion device, it is a comparatively simple matter to so regulate the operation of the governor that any desired maximum speed within very wide limits may be obtained. Unless otherwise specified, the governor is set at the factory to cut off at 1,350 revolutions a minute. Due to the method of "hook up," however, it does not come into action until the speed of the motor is within 100 revolutions of the maximum, thus permitting full power to be realized right up to that point.

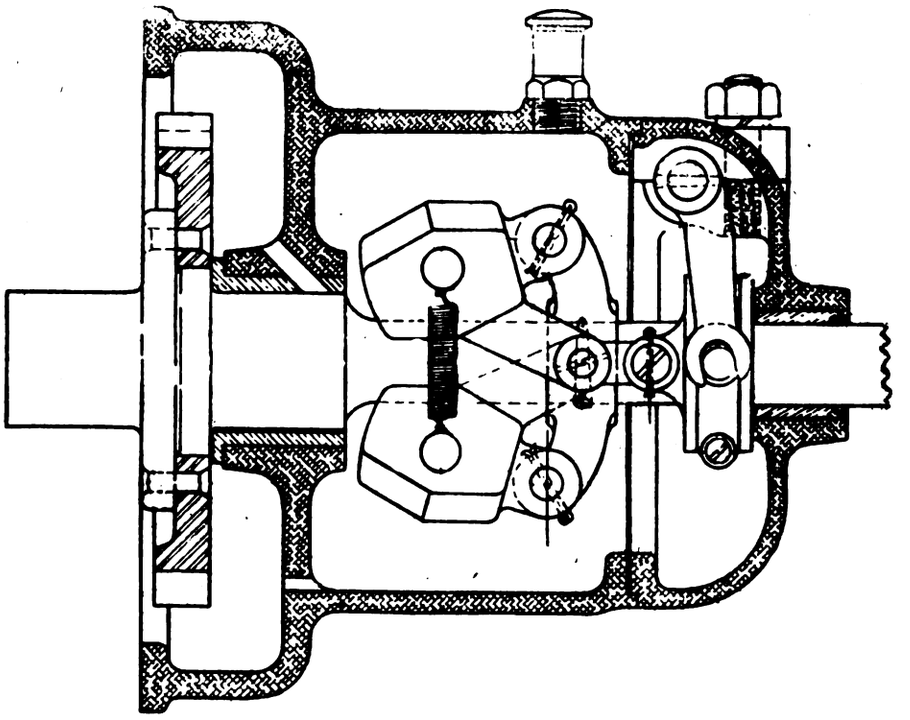


SHOWING CONSTRUCTION AND OPERATION OF HAZARD GOVERNOR

Though it might appear that there is little reason for such great variety of construction, each governor represents the particular ideas of the individual designer who has attacked the various governor problems in his own particular way. Not the least of these problems is to design a device of the kind that shall operate positively to hold the engine speed constant regardless of load fluctuations. When a governor alternately opens and closes the throttle for no apparent reason, and despite the fact that the load remains practically constant, it is said to "hunt." A "hunting" governor is an abomination, for, though it may operate to close the throttle immediately a predetermined speed has been reached, it cannot be relied upon to maintain constant engine speed and therefore throws unnecessary shocks on the mechanism, when, according to all the tenets of engineering the torque really should be maintained steady. It is to eliminate the tendency to "hunt," which is an inherent fault of all governors and must be carefully considered in designing as much as to anything else that must be charged the great variety of design which obtains. In steam engine and large stationary gas engine practice dashpots and springs have been used to some purpose to correct this fault. The employment of such devices for motor vehicle work, however, scarcely is possible and engineers perforce have developed new arrangements of the parts to cope with the trouble.

As indicating the endeavors to overcome "hunting" tendencies, the ring type governor, which is another that rightfully belongs in the centrifugal class, is interesting. Its use is restricted, however, the most prominent manufacturer making use of its being the Locomobile Co. of America, which recently entered the commercial vehicle field with a five-ton truck. In the ring governor, the balls are replaced by a ring of metal, which has as its center the driving shaft. The ring is so hung that it does not balance, however, the normal position being as nearly along the axis of the driving shaft as the thickness of the metal ring will permit. Consequently, immediately the driving shaft is rotated the ring tends to straighten out at right angles with the shaft and in doing so moves a sleeve connected with the throttle lever. The interesting feature of the governor is that immediately the ring assumes a position at right angles, or very nearly at right angles to the driving shaft under the influence of centrifugal force a gyroscopic action is obtained. As the effect of this gyroscopic action is strongest when the ring is at right angles to the shaft, the tendency to "hunt" practically is damped out.

Another type of governor which is not very extensively used, though it has many features that commend it, is the hydraulic, or water, governor. Most notable among those who use it is the Autocar Co., whose device is shown herewith in section. As may be seen by the picture, it is not of the



PEERLESS CENTRIFUGAL TYPE GOVERNOR IN SECTION

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centrifugal type; in fact, it has remarkably few moving parts of any kind and therein lies one of its principal advantages. Incidentally, its construction is such that "hunting" is practically impossible. It operates through the pressure of the water in the cooling system, a pump being relied upon for circulation. In its simplest aspect it is merely a flexible diaphragm held in a tight casing. By means of a spring, a rod is pressed against one side of the diaphragm and connects directly with the throttle lever. The cooling water is piped into the other side of the casing and the pressure it exerts on the diaphragm moves the rod and regulates the side of the throttle opening. The faster the engine is run the greater is the pressure in the cooling system and the greater the pressure exerted against the diaphragm. Consequently the governor may be set to "cut off" at any predetermined speed. Like the others, the Autocar governor may be sealed (in fact, it is sealed at the factory) and cannot be tampered with without the knowledge of the owner.

Though there are any number of excellent brands of trucks that are without speed governors those that have them gradually are assuming the ascendency. With very few exceptions all the new vehicles that have been brought out during the past year are governed so that they cannot be driven at excessive speeds and it would seem that in no other way can the best interests of the owner be conserved. In the majority of cases governors are arranged to limit the speed of the engine and thus to limit the speed of the truck. In several cases, however, they are so arranged that they are inoperative when low gear is engaged, the object being to permit the maximum power of which the engine is capable for use in emergency, as when the vehicle becomes mired, etc., or when an exceptionally steep hill is encountered.

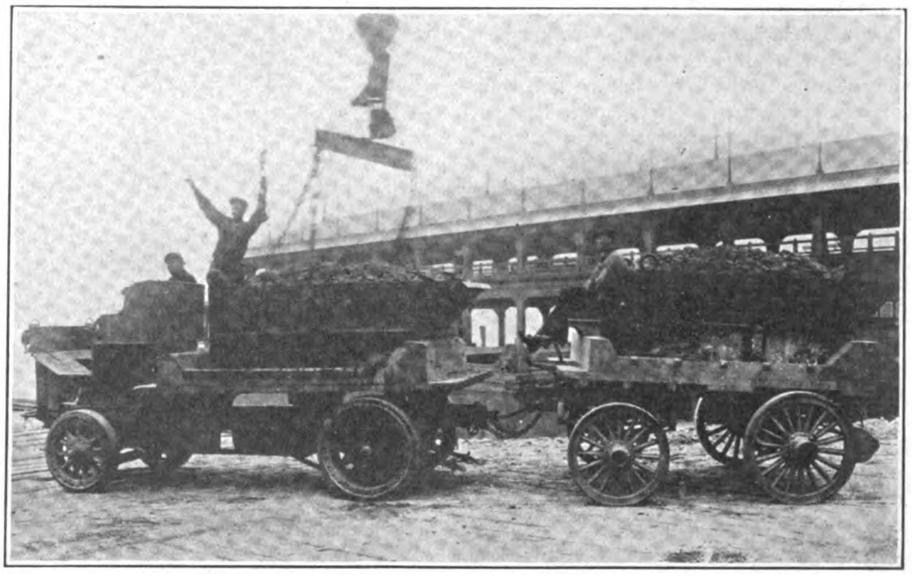
To Detect Acid in Lubricating Oil.

Theoretically, lubricating oil should contain absolutely no acid, though in practice it is difficult to remove the last trace of this harmful substance. Such oils as are marketed by reputable manufacturers contain so little of it that it is practically impossible to detect it and its effects are nil. Cheaper oils may contain sufficient acid to have a very harmful effect on the bearings and the cylinders, however, and there are several simple methods of detecting its presence. Probably the simplest of these is to place a small quantity of the oil in a closed bottle and add to it an equal amount of water in which has been dissolved a small quantity of sodium carbonate. If the mixture then is shaken violently and set aside to settle, the amount of precipitate will be a gauge of the amount of acid present. It will not indicate the quantity of acid present, however, but may be used to determine the relative quantities of acid in the several samples of oil which it is desired to test.

EXPEDITING EXCAVATION WORK

How Rock is Handled on One Section of Catskill Viaduct—13-Ton Loads Carried on Garford Truck and Trailer.

The problems that are involved in the engineering of a huge undertaking, such as the subterranean conduit now under construction, which is to convey daily 500,000,000 gallons of water from the Catskills to the five boroughs of Greater New York, are not confined to the excavation of rock and earth and the hoisting of such material to the surface. The excavated material must be disposed of somehow, and while in the sparsely inhabited districts through which the upper reaches of the 100 mile aqueduct runs there are many opportunities for dumping, the million or so of cubic yards that must be brought to the surface in the crowded streets of Manhattan cannot be left awaiting transportation and cannot be dumped at any nearby and convenient place. But quick removal is an engineering necessity and economical haulage a commercial requirement; so, after the comparison of horses and motor trucks that still is invariably made before the more modern method is adopted, it was decided by the Pittsburgh Contracting Co., which has contracted to excavate that part of the tunnel which will lie between 106th and 176th streets, to make use of motor vehicles.



GARFORD TRUCK AND TRAILER WITH LOAD OF 13 TONS

The first machine is now at work, and it is proposed to add six more. The truck, which is a Garford of 6½ tons capacity, not only carries its own load, but also hauls a trailer which carries a like weight. The dumping point is at 129th street and the Hudson River, where the material is being used to fill in and make new land. The truck is fitted with a special wood body designed to carry a removable "skip" or bucket. The material from the excavation is hoisted in mining cages, emptied into a bin at the head of the shaft and from the bin delivered through chutes into the skips, which are left hanging under the chutes. When the truck with its trailer comes up its empty skips are hoisted off, two loaded skips put on and the machine pulls out. At the dump the loaded skips are removed, dumped and replaced on the trucks, which return and repeat the performance. The trailer system makes it possible to handle 13 tons of rock at a single haul, while the speed of the motor results in much quicker work than could be expected from horses, even with the much lighter loads they would haul. Moreover, it is expected that when the work is in full blast and the full force of motor trucks is at work, the machines will be worked night and day, through the three eight-hour tunnel shifts, while it would be necessary to have relays of horses in order to keep the bins clear of rock.

"Roughening" That May Ruin Clutches.

There are several specific remedies for slipping cone clutches and these remedies should be applied according to the condition of the clutch. Generally an application of neatsfoot oil, allowed to soak in will be efficacious. Otherwise it may be necessary to apply new leather, provided, of course, that adjustment for natural wear cannot be made. In all seriousness, some one or other has suggested roughening the inside of the cone to overcome slipping, but even to the veriest novice the folly of such a procedure must be apparent. Roughening the cone positively will ruin the leather facing in an exceptionally short time, to say nothing of causing excessive heating while the clutch is being engaged. The method might temporarily overcome the difficulty, though the permanent evil will be infinitely worse.

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KEYING THE WHEEL TO ITS SHAFT

New Methods That Have Replaced the Old—Various Forms of Keys and Keyways—Locomotive Shop Practice.

Keys and keyways are not used as commonly at the present time as they were in the earlier years of motor car building. In the natural sequence of events motor car machinery was at first built very much as was other machinery, and the key-and-keyway method of securing a gear or a flywheel to a shaft was the obvious method. From the very beginning of the machinery age it had been used and found adequate.

It did not require very many years of motor car work, however, to demonstrate that a motor that was capable of jumping from a very slow speed to a very high one in a few seconds, with a proportionate increase in the horsepower transmitted, and that was expected to sustain without damage the shocks due to the sudden application of a load when running at high speed, made it necessary to replace the good old key with something better. So, for flywheels and gears transmitting considerable power, the usual method now is to form a flange integral with the shaft and bolt the wheel to it. Such a fastening is an extremely safe one, when properly made. There still are many places, however, where keys and keyways are used on gears that transmit but little power in proportion to their size.

In its most familiar form the keyway is a slot or rectangular groove cut half in the shaft and half in the hub of the wheel, the cutting being very carefully done so as to maintain the same width and height of keyway from end to end, or else, in some cases, to give a slight taper, the inner end of the keyway, of course, being the smaller. In what mechanics would call "particular jobs" the keys always used to be hand fitted, being filed up to good bearing surfaces on all four sides. In hand fitting a key it is driven in gently and then withdrawn. The spots where binding occurred, indicated by marks on the key, are "eased" with a file and the key again is driven into its keyway. If the filing is properly done, the key will go in somewhat deeper and will bear more evenly on the walls of the keyway. A skilled fitter will so gauge his work that by the time the key has a good bearing all round it will be just tight enough in the keyway to permit of its being finally driven home with considerable force. Fitting a key on an important "job" used to be one of the nice pieces of work in the old-time machine shop. In these days of accurate machine work, however, the work of fitting a key is reduced to a mere trifle, if, indeed, any hand fitting at all is needed.

A form of keying that is very commonly used in all kinds of machine work is what is known as the Woodruff system. In this the key, instead of being a rectangular bar, takes the form of a steel half disk, the rounded edge of which is sunk in a slot of the same shape cut by a special milling cutter in the shaft, leaving the straight edge projecting above the shaft a height equal to the depth of the keyway in the wheel hub, which is of the ordinary form. The key is put in place first and the wheel forced on the shaft afterwards; the shape of the key and its slot in the shaft permits it to shift its position slightly and so automatically fit itself snugly against the top of the keyway in the wheel hub.

Sometimes it is necessary to key a wheel to a shaft under peculiar conditions, and the conventional method will not always answer. For instance, there is a method of permanently securing a key to a shaft at a point removed from the end, so that the wheel could be driven up on it. The keyway is cut in the shaft and the ends of the slot are "cut under" so that the slot will be longer at the bottom than at the top, or, in other words, at the periphery of the shaft. Then a steel key is made the shape of the shaft keyway; that is, its ends are not cut off square, but on a slant, so that the key is longer on the bottom than on the top, just as is the keyway in the shaft, and it is made just a shade tight for the keyway in the wheel hub. The key now is too long to go into the keyway in the shaft, so it is carefully bent, the short side, or top, being the outside of the curve, until it is short enough to enter the slot in the shaft, and while in position in the keyway it is carefully straightened out with a hammer and a piece of brass or copper until it assumes its normal length and its pointed ends extend into the undercut ends of the keyway. If the work of shaping has been properly done, the key will just fill the space tightly when it is straight. It cannot come out. Having been left a little large, there is stock enough to allow for the proper fitting of the wheel keyway and to permit of smoothing out any irregularities made by hammering. This trick used to be a common one in railroad shops in fitting gears on the axles and countershafts of velocipedes and "pump cars."

A variation of the key principle, which is used for very light work, is the device known as a "Dutchman," which consists of a round hole drilled half in the shaft and half in the hub, tapped and a machine screw put in. A variation of the "Dutchman" idea is found in the use of a taper pin driven into a taper-reamed hole.

When it is desired to have a gear or wheel slide along a shaft without turning on it, the key-and-keyway principle is used in many cases; the key is made a little longer than is required for the length of travel required and is either secured in slots cut in the shaft or made integral with the shaft, the latter practice being frequently adopted in motor car work where the gears of the transmission system slide on their shafts. It is usual to employ from two to four keys and keyways in such work in order to provide ample wear-resisting surface, and to harden the sliding surfaces. And in changing their length, the keys change their designations and are known as splines or feathers. The same end is achieved by using a square shaft and cutting a square hole in the wheel hub—a method that has much to recommend it and is largely employed in motor car construction.

While set-screws may be said, in a way, to come under the general heading of keys, they are so unsatisfactory as to be unfit for anything but the lightest work. Their holding power is slight, and where there is much vibration and intermittent strain it is next to impossible to keep a set-screw in place for any length of time, even by the use of jam-nuts and lock-washers.

An interesting contrast to the key-work on a motor car is found in the old method of keying the eccentrics on the driving axles of locomotives. The eccentric sheaves, made in halves, were key-wayed, but the axles were not. A fitter and his helper, the latter usually one of the apprentices, would be assigned to the job of setting the valves, during which operation the eccentrics were held in place on the axle by means of wedges. When the exact position for them was found it was very carefully marked on the axle, the eccentrics removed and the keyways marked out, all by the light of a flaring oil torch. Then the keyways would be cut in the axles with a huge chisel, twelve or fourteen inches long, held and guided by the fitter and "persuaded" by means of a "flogging hammer" or light sledge wielded by the apprentice, whose far from easy task it was to watch the head of that chisel and hit it every time, regardless of its frequent movements. The penalty for missing the chisel and hitting the fitter's wrist or arm depended largely upon the temper of the recipient of the whack, but it always was such that the greatest care was exercised to find the head of the chisel on all occasions. Once rough cut, the keyway was smoothed out with a file and the big keys, a couple of inches square, fitted with the most painstaking care.

The difference between this kind of work, done in a pit where head room was very conspicuously lacking, in cramped positions and by the light (so-called) of a smelly, smoky sperm-oil torch, and the swift, clean, accurate work now done in motor car factories, forms a contrast that is striking, to say the least, and one which illustrates forcibly the difference between old-time hand work methods and the newer way.

Filtering Renews Lubricating Oil.

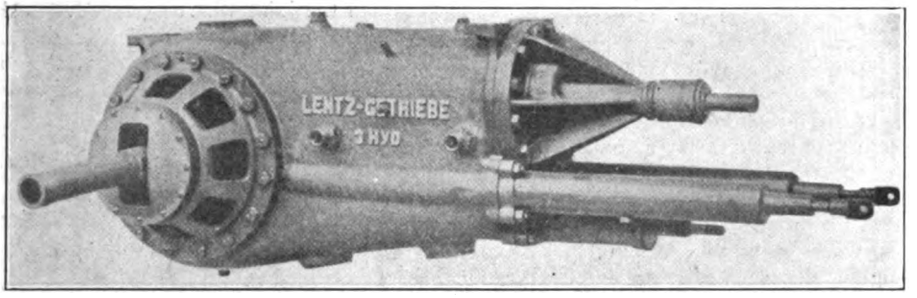
Lubricating oil that has been used can be made fit for use again, in many cases, by the simple process of filtering it through a piece of pipe, about ⅜ of an inch in diameter and several feet long, bent into the shape of a siphon and filled with cotton wool. The oil is run from one tank or can into another through the siphon.

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ANOTHER HYDRAULIC TRANSMISSION

Of German Origination, It Is Backed by Large Claims and Abundant Faith—Its Operation and Control.

Smoothness of operation, that degree of flexibility which characterizes the motion, and especially the acceleration, of a steam-driven vehicle, is a desideratum which long has been sought through many and diverse channels, since the first explosion motor-driven vehicle was devised. The search has led through the realms of friction devices, and an endless variety of systems dependent on friction to compensate for the lack of perfect flexibility in the gasolene motor has been conceived, and made, and put on the market. Some naturally have been better than others, and as a consequence have survived; these are the automobile transmissions that are known today. Others either failed to afford the necessary degree of flexibility, or afforded it at a cost which has made the application prohibitive.



LENTZ HYDRAULIC TRANSMISSION—A NEW GERMAN PRODUCT

However, perfect flexibility, that is, flexibility which will permit of the machine starting from rest and attaining its maximum speed at a uniform rate of acceleration, never has been attained with a friction device, although excellent results have been the fruit of much work and study on the part of the designers. Electric transmission systems have been tried and given very fine results in so far as the flexibility is concerned, but as a rule, with such systems, the weight is greater than with the friction device, and the efficiency is considerably lower. Hydraulic systems have been tried in a variety of different forms and shapes, but all save one, which is now on the market in this country, have proven too inefficient, or too complicated, to compete with the better understood and more commonplace system in which the gearset and clutch is used.

An hydraulic transmission system which, according to a German print, seems to merit serious attention, recently has made its appearance on the German market. It is the product of one Hugo Lentz, of Berlin-Grunwald, and has been placed on the market only after repeated tests under varying conditions on several different types of motor vehicles have demonstrated its worth to the satisfaction of the maker.

The transmission proper is housed in the casing, which is supported by cross members which attach to the frame. The entire weight of the transmission is taken by the cross members, and the live axles are not enclosed.

In operation the system is similar to hydraulic drives which already have appeared, one of which is giving good account of itself at the present time in this country. Fluid pressure is created by the action of a pump driven by the gasolene motor, and this pressure in turn is reconverted into work by two hydraulic motors, which are placed in the rear of the transmission housing and which drive the rear wheels through the medium of the axles. The power to drive the pump is received from the engine through the medium of a propeller shaft, while two smaller shafts, which connect with the operating levers, serve to control the action of the pump and the motors. The motors are not coupled together, so that the difference in the distance traversed by the two driving wheels when rounding a corner, and which in practice involves the use of a differential, is compensated for by the varying speeds of the motors themselves. The control of the device is accomplished entirely by the manipulation of two levers, one of which serves to reverse the action of the fluid in the motors so that the reversal of the direction of the vehicle is possible, and the other, which is the throttle and is linked to the throttle of the engine as well, serves to alter the rate of flow of the liquid to the motors, or to stop the flow altogether, by shunting the liquid through a by-pass.

The action of a car fitted with the device is said to be smooth and pleasant in the extreme, for simply by advancing the throttle the vehicle is set in motion without the slightest jar, and the acceleration continues at a perfectly uniform rate until the machine has reached the maximum speed of operation. By suitable manipulation of the reverse lever, the speed of the car can be checked, for the motors then are converted for the time into pumps which force the liquid through more or less constricted passages, at the will of the operator, and braking is accomplished. As for the mechanical efficiency of the Lenz transmission, as compared with others, nothing is said.

FAR-REACHING FACTORY INSPECTION

Rigid Tests and Scrutiny to Which Parts and Cars Are Subjected—Marmon Methods as an Example.

One of the secrets of production in huge quantities, for which American manufacturers of motor cars and other mechanical products are famous, lies in the fact that the most elaborate precautions are taken to ensure minute accuracy in dimensions, so that all parts of a kind will be exactly alike and any two that are designed to fit together, will fit together without any hand work. On this one factor a great deal depends; in particular, the smooth running and wearing qualities of the car, the rapidity of production and the price. Parts that run in frictional contact not only must fit into their places easily, but they must be a close, accurate fit, so that there will be no lost motion or play, which of course would increase any tendency to wear from the very beginning. Any delay or difficulty in assembling finished parts would involve just so much extra time, and, of course, extra expense, which necessarily would have to be added to the price of the completed car. It is fairly clear, then, that there is ample justification for the exceedingly elaborate and extensive systems of gauges, jigs and of inspections that are the rule in motor car factories, where dimensions are reckoned not only in thousandths of an inch, but in some cases in ten-thousandths of an inch, and parts that do not fit at once are simply discarded by the assemblers.

In some large factories, as, for instance, the Nordyke & Marmon factory in Indianapolis, the gauging and testing systems are carried to such lengths that by the time a car is completed its various parts have passed through approximately 10,000 separate inspections, in the aggregate. Not only is every dimension of every part calibrated, but in most instances this is done several times, to avoid, as far as possible, any error of any kind. The testing process begins at the very beginning, for when the raw material is received its characteristics are determined before it is permitted to be used. In the case of a steel ingot, for instance, a hole is drilled in the metal and the shavings that curl up from the point of the tool are put in an envelope, which is marked with the number borne by the billet, and sent to the metallurgical chemist, whose analysis determines whether the steel shall be used or returned to the makers—a somewhat rare thing, now that steel makers have become accustomed to the exacting demands of the motor car makers. Steel containing erroneous proportions of the elements entering into its composition would make no end of trouble throughout the factory, for all heat treating and hardening processes are figured out according

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to a certain analysis, and it does not require a very wide departure from absolute accuracy in this respect to alter considerably the results in the process of manufacture. As the parts are put through in large numbers all receiving exactly the same treatment, uniformity in results depends upon uniformity in composition. Bronze and aluminum are subjected to the same routine. A second analytical inspection is made of samples from forgings or castings made from the raw material, as a check on the first analysis. In some factories, samples of metal are given physical tests for tensile strength, and so on.

Having received the O. K. of the corps of preliminary testers, the material is turned over to the shops for turning, boring, drilling, shaping, milling, grinding and otherwise machining into motor car parts. Wherever it is possible—and it is possible in almost every case—machine work is done in machines that are wholly or partly automatic in their operation. Some machines, such, far instance, as those which make small parts, turned one by one from a round bar, are entirely automatic, forming, finishing and cutting off piece after piece with unfailing accuracy, as long as the supply of material is maintained. One man can easily attend to several such automatics. Other machines, including those in which the larger parts are finished, are automatic only in that once started, they cut just so far and no farther. But in all cases the accuracy of the machines is not relied upon; all the parts are repeatedly gauged.

The final measuring tests or inspections are made after the parts have been hardened, or otherwise heat treated, and ground to their final working surfaces. After that they are ready for the stock room when they have been tested for hardness by means of the scleroscope. Then comes the beginning of the work that is the real proof of the closeness of the work already done.

All parts when finally finished are sent to the stock room, where they are stored systematically. From the stock room the parts are taken and assembled into what are called units, and these units are returned into stock. For instance, the various parts that go to make up a complete cylinder will be the cylinder itself, the valves, valve springs, guides and so on, all of which are properly assembled so that the cylinder is all ready to bolt into place on the crankcase. Another unit would be the crankcase, with camshafts, crankshaft, valve actuating gear and so on all in place, ready to receive the cylinders. And so on, throughout the whole car. The units are later assembled, forming complete motors, or complete rear axles, or complete speed change gears and so on, in which form they go to the final assemblers who make up the complete cars. The engines usually are given brake tests and in addition are "run in" by belt to smooth them up and to make sure that there is no binding and no tendency of any of the bearings to run hot. The brake or dynamometer test and the final inspection, in which the motor is again taken apart, are the last operations before the motor is put into a car. Special tests are provided for the assembled rear axle system.

The final test on the road is followed by another inspection of all parts, a thorough cleaning of the engine, the removal of carbon and the re-grinding of the valves. After this, if no defects have developed, the car is ready for the paint shop, the body shop and a finished car inspection.

Facilitating the Use of Grease Guns.

In the manufacture of that class of artillery known as grease guns, there has been as much improvement relatively as in almost any other line of motor car supplies, and this is well illustrated by the appliances made by the Wilson Instrument and Specialty Co., of Passaic, N. J., whose grease gun with flexible spout or nozzle is illustrated herewith. The nozzle can be bent to any extent not exceeding a right angle, and in the case of the gun illustrated is six inches long. The end is threaded to fit the standard tapped hole for grease cups, and for the purpose of injecting a quantity of lubricant the grease cup can be unscrewed, the nozzle screwed in its place and the grease forced in without leakage. The barrel of the gun is of heavy seamless brass tubing, ground true and fitted with a piston that also is ground true; thus the gun will handle light oil as well as heavy grease. For facilitating the loading of the latter, the bottom cap is removable.



The same basic features—the heavy brass ground barrel and flexible nozzle—mark the other guns bearing the company's trade name, "Wisco," but other improvements are added to the more expensive guns. For facilitating the handling of very heavy grease there are threaded plunger rods which can be instantly disengaged and moved freely when changing to take light grease or oil; and the most elaborate arrangement is embodied in a gun that can be used as a reservoir for grease or oil. The mode of procedure is to fill the gun with lubricant in the usual way, remove the spot or nozzle and replace it with a small plug, and then take out the piston rod, which fits into a sheath secured to the outside of the barrel. Thus the gun can be carried full of grease or oil and ready for use, but without occupying any more room than if empty. This particular gun is put up in a hardwood case and has a 12-inch flexible spout and two tips, one for oil and the other for grease.

Oil On Tires From Unsuspected Source.

It is fairly well known that the effect of oil on rubber is to cause disintegration, and though as a general rule great care is taken to insure that oil does not come in contact with tires by leaving the car to rest on a perfectly clean surface there is another way in which oil accumulates on tires and it is even more harmful than when only the treads stand in a pool. Not all cars drip oil. The oil seldom is thin enough to ooze through the very small clearances that are used and if it does leak out it seldom drops to the ground. When the car is driven, however, such oil that may have leaked out along the propeller shaft, for instance, is thrown off by centrifugal force and most naturally finds lodgement on the tires. By reason of the fact that it is on the inside the tire, near the bead, it is not worn off on the road. Incidentally the place in which the disintegration takes place makes blow-outs more likely because the side walls are much thinner than the tread and will withstand less of such action. A simple way out of the difficulty is to fit a light sheet iron, or tin, guard over the front end of the differential housing so that any oil that may leak out and be thrown off will be caught before it reaches the tires. Though the joint where the propeller shaft enters the differential housing is the most flagrant offender in this respect, the same remedy can be applied to other joints with equal facility.

Doing Large Work on Small Lathes.

Often it becomes necessary to turn out parts that are larger than the capacity of a given lathe ordinarily will permit, and though such circumstances may place the operator in an awkward predicament a little ingenuity will work wonders. For instance, supposing it becomes necessary to true up an 18-inch flywheel and the only lathe at the disposal of the worker will permit of only, say, 10 inches swing. It is quite possible to "chuck" a long shaft, using the center rest and permitting the shaft to project through the tail stock of the lathe. Then if the flywheel is fastened to the end of the shaft so that it overhangs the lathe bed the operation will be comparatively simple. Another method of doing large work in a small lathe, or rather in two small lathes, is to place the head stocks of two lathes back to back, one of them being disconnected from the source of power, and then fastening the work between them, the second lathe serving more as a tail stock. This is perhaps the better method, as more accurate work may be turned out and there is less difficulty in properly setting the lathe tools.

To Close Leaking Joints in Manifolds.

Nothing is more exasperating than the persistent leaking of a flange joint on the manifold, where copper is used for the gasket. The trouble, however, nearly always can be remedied by cutting a groove around the port with a cold chisel, and another around the hole in the flange. When the studs which hold the manifold in place are drawn up, the gasket is compressed and partially fills the groves, sealing the joint.

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1,006,063. Device for Cranking Automobiles. John S. Clarke, East Cleveland, O., assignor of one-half to Alexander H. Langell, Cleveland, O. Filed July 1, 1910. Serial No. 569,862.

1. In a road machine having an engine shaft, a rotary device adapted to be operatively connected with one end of said shaft, an air storage tank and a plurality of air passages open from said tank into said rotary device, valves controlling the passage of air in said passages respectively, a hand lever and mechanism therefrom adapted to open and close said valves and an air passage between said passages leading to the connection between the said rotary device and said shaft and a piston in said latter passage adapted to close said connection with the shaft.

1,006,088. Carburetter. Arthur Hippisley, Bath, England. Filed Sept. 23, 1910. Serial No. 583,439.

The herein described carburetter, comprising the combination with the carburetter-casing, of a hollow ring A concentrically disposed within the said casing and being provided with a plurality of symmetrically arranged jet outlets, a rotatable sleeve J carried by the ring and the casing, the said sleeve forming a central air passage and having ports of different lengths adapted to progressively cover or uncover opposite jets in pairs, substantially as and for the purpose specified and shown.

1,006,103. Method of Making Ball Bearings. Oliver C. Knipe, Washington, D. C. Original application filed Dec. 20, 1909, Serial No. 534,207. Divided and this application filed Dec. 14, 1910. Serial No. 597,207.

1. The method of welding one body of metal to another body of metal consisting in bringing the parts into contact along an extended edge creating an instantaneous welding heat transversely through the joint, and exerting a slight pressure on the abutting edges, whereby the weld is effected, before the adjacent parts are changed in their molecular or physical condition.

1,006,157. Semirotary Motor. Matthew J. Weber and Mark Huggins, Columbus, Ohio. Filed Aug. 29, 1910. Serial No. 579,386.

1. A motor comprising a base, a shaft journaled in the base, a crank attached to the shaft, a stud mounted upon the crank, cylinders mounted upon the base, a valve chamber connecting the cylinders together and having an inlet and outlet port, a partition dividing the valve chamber into compartments, ports communicating with the interiors of the cylinders and the said compartment, valve stems projecting through the ports and carrying valves, plates connecting the valve stems together, springs located upon the said plates and being housed within the cylinders, valves located upon the valve stems, a piston rod arranged for reciprocation in the cylinders, pistons attached to the piston rod and adapted to come in contact with the springs upon said plate, an arm attached to the piston rod and journaled upon the said shaft, an arm pivotally mounted and having an elongated slot which receives said stud, said piston rod having a recess which receives the outer portion of the last mentioned arm.

1,006,179. Wheel. George J. Bradbury, Twining City, D. C. Filed Apr. 24, 1906. Serial No. 313,505.

1. In a wheel of the class described, the combination with a hub casing, a rim and a series of spokes, of a bearing member, a series of polygonal blocks mounted on said member, the said blocks being arranged on said member relative to each other so that their side walls extend in different directions at right angles to lines radiating from the axis of the wheel, a series of thrust members arranged within said hub casing, each in engagement with the adjacent side wall of a block and movable radially independently of adjoining thrust members, a plunger for each thrust member, and a compression spring for each plunger operating to force the plunger inwardly toward the axis of the wheel.

1,006,225. Shock Absorber. George F. Kern, Buffalo, N. Y. Filed Sept. 1, 1909. Serial No. 515,601.

1. A shock-absorber comprising a spindle, a pair of disks mounted on said spindle and adapted for opposite rotation thereon, one of said disks having an opening near its axis and the other disk having an opening near its periphery, a sleeve surrounding said spindle and separating said disks, a spiral-spring surrounding said sleeve and having opposite ends bent laterally in opposite directions and fitting into the openings of said disks, and diverging levers on said disks adapted for connection to two different points of a vehicle.

1,006,244. Explosive Engine. Abbot A. Low, Horseshoe, and Harry Hertzberg, New York, N. Y.; said Hertzberg assignor to said Low. Filed Oct. 12, 1907. Serial No. 397,193.

1. In a vaporizer for internal combustion engines, a piston cylinder, a metallic elbow-shaped box or casing closed at one end and attached at its elbow end to the cylinder, means positioned at the elbow end for spraying a liquid fuel into contact with the walls and the closed end of said box or casing, and a heating coil wound externally upon the box or casing, and in mechanical contact therewith, for heating the metal comprising said box or casing.

1,006,348. Wrench. Augustin Beran, Vienna, Austria-Hungary. Filed Mar. 9, 1910. Serial No. 548,184.

A wrench comprising a handle having at one end a jaw extending laterally from the handle and provided at its extremity with an inwardly extending lug, a second jaw of greater length than the first-named jaw provided at one end with spaced ears engaging the handle at the junction of the first-named jaw therewith, a pivot pin passing through the ears and the handle for last-named jaw having at its free end an inwardly extending lug, a plurality of pins passing transversely through the handle in rear of the pivot pin of the movable jaw, and a substantially yoke-shaped spring bearing at its body portion against the movable jaw, the arms of the spring having coils intermediate their ends engaging the last-named pins, the free ends of the arms engaging the ends of the other last-named pin.

1,006,350. Spring Wheel for Road Vehicles. George Bird, Earley, near Reading, England. Filed June 27, 1908. Serial No. 440,724.

2. In a spring wheel the combination of a hub member and a rim member disposed with an annular space between them, a series of radial springs working in compression, a series of circumferentially-disposed springs working in compression, and sockets, enveloping the radial springs for a considerable part of their length, said sockets being alternately disposed on the hub and rim members and alternate sockets having inclined side faces forming abutments for receiving the thrust of the circumferentially-disposed springs which act in compression between the adjacent sides of the pockets, said radial springs being free at one end to slide with relation to the member against which they abut.

1,006,376. Tire for Wheels. Frank Gallagher, Ridgeway, Iowa. Filed Mar. 31, 1910. Serial No. 552,555.

1. In a tire for wheels, a rim having a tread and inwardly extending flanges with shoulders, a member disposed between the sides of the rim, a spring for holding the member normally away from the tread and against the shoulders, there being a space between the inner ends of the flanges, and a felly free from the member, disposed for moving in the said space and against the member.

1,006,384. Spring Wheel. Lewis Johnstone, Chester, England, assignor of one-third to William Bridgett Pritchard and one-third to Harold Porter Mellor, Manchester, England; William Bridget Pritchard, the younger, executor of said Lewis Johnstone, deceased. Filed Aug. 4, 1908. Serial No. 446,963.

1. In a spring wheel, the combination of an outer rim, an inner ring spaced therefrom, a series of springs placed between said rim and ring and yieldably holding them in spaced relation, a pair of lateral floating flanges one on each side of the space between said rim and ring, ties connecting each of said floating flanges with the rim and rings respectively, and springs between said flanges.

1,006,387. Carburetter. Oscar C. Kreis, Jr., Detroit, Mich., assignor to Gray Motor Company, Detroit, Mich., a Corporation of Michigan. Filed Dec. 13, 1909. Serial No. 532,781.

1. In a carburetter having an air passage therethrough, a mixing chamber, and an opening adapted to deliver liquid hydrocarbon to said chamber, a rotating member adapted to adjust the area of said passage, a pipe on said rotating member located that one of its ends shall be in communication with the outer air when the first-mentioned air passage is partly closed and having its other end opening into said mixing chamber so located relative to said rotating member and to the hydro-carbon in said chamber that said other end shall always maintain the same relative position relative to the hydro-carbon in said chamber.

1,006,401. Automobile Cranking Mechanism. John P. Petit, Salem, Ore. Filed Mar. 3, 1911. Serial No. 611,988.

The improvement in starting devices for automobiles, substantially as herein described, comprising in combination, an engine shaft, a ratchet wheel fast thereon, a sprocket wheel forming a housing for the ratchet wheel and provided with a pawl engaging the ratchet wheel, a starting shaft, a sprocket wheel loose on the starting shaft and provided with a slip section, a slip clutch section keyed to and movable along the starting shaft, a spring pressing such clutch sections normally into engagement with each other, a chain connecting the sprocket wheels of the engine shaft and starting shaft

1,006,411. Carburetter. William Scott, Medford, Mass., assignor to Scott Manu-

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facturing Company, a Corporation of Massachusetts. Filed July 8, 1909. Serial No. 506,493.

1. A carburetter having a carbureting chamber provided with an air inlet and two fuel ducts leading into said chamber, combined with means for making a preliminary adjustment of the capacity of one of said ducts; and means for automatically varying the capacity of the other duct in response to the pressure of the air entering the carbureting chamber.

1,006,416. Compound Gas Engine. Michael H. Sullivan, Poughkeepsie, N. Y., assignor to John Lawrence Murphy, Chelsea, Mass. Filed Aug. 12, 1907. Serial No. 388,226.

1. In combination in an explosion engine, a high pressure cylinder having a main and auxiliary exhaust port, a turbine wheel, a direct connection between the main exhaust and the turbine wheel, an accumulator arranged in said connection and having a cubic capacity less than the cubic capacity of the high pressure cylinder, means for opening the other exhaust port for the unobstructed exit of the remaining gases to the atmosphere after the first exhaust port has been closed, a shaft for the turbine wheel, and a piston operated in the high pressure cylinder and connected to drive said shaft.

1,006,431. Engine. William H. Cameron, Toledo, Ohio, assignor to The Willys-Overland Automobile Company, Toledo, Ohio, a Corporation of Ohio. Filed July 10, 1911. Serial No. 637,732.

1. In an engine, the combination with a crank-case having valve rod bearings therein and the valve rods working in said bearings, of bushings mounted in said bearings and terminating short of the upper ends thereof to co-operate therewith to form receptacles for receiving oil which works outwardly from the crank-case around the rods, said bushings having drainage passages provided longitudinally thereof in communication at their outer ends with said receptacles and at their inner ends with the interior of the crank-case, and closure means for the top of said receptacle.

1,006,525. Vehicle Wheel. Albert E. Beall and Charles F. Skellenger, Clinton, Iowa, assignors to Iowa Motor Wheel Co., a corporation of Arizona. Filed Aug. 26, 1910. Serial No. 579,116.

1. In a vehicle wheel, the combination of a felly provided with recesses in one of its sides, a tire loosely surrounding said felly, a plurality of slotted links pivoted to said felly in said recesses, and pins on said tire for engaging the slots in the links.

1,006,476. Combustion Motor withReciprocating Piston. Wassily Grinewezki, Moscow, Russia. Filed Jan. 28, 1907. Serial No. 354, 575.

1. An internal combustion motor comprising in combination a combustion cylinder, an air cylinder, an expansion cylinder, pistons, connecting rods therefor and a common crank shaft, the crank for the piston of the air cylinder being displaced forward by an angle from 145 to 120 degrees relative to the crank of the piston of the combustion cylinder, and the crank of the piston of the expansion cylinder being displaced rearward by the same angle relative to the said crank of the combustion cylinder, together with valves located between the cylinders and adapted to control communication between the air cylinder and the combustion cylinder and the expansion cylinder and the combustion cylinder.

1,006465. Vehicle Wheel and Tire. Melville Clark, Chicago, Ill. Filed Oct. 1910. Serial No. 587,793.

1. A wheel tire comprising guards and an intervening flexible and elastic tread member and an inclosed pneumatic tube or air spring, the tread member having distributed throughout its inner circumference a multiplicity of housings embedded in said tread member, and transverse rollers journaled in such housings with their inner circumferences exposed for contact with the outer circumference of the penumatic tube.

1,006,570. Cover for Pneumatic Tires. Richard Latour, Menin, Belgium. Filed Jan. 20, 1910. Serial No. 539,163.

In a pneumatic tire, the combination with a rubber core in the form of the tire and having beaded margins, of forming bands for the said beaded margins, and reinforcing means for said tire, said reinforcing means including a series of cords arranged in parallel strands with looped ends, having their middle portions disposed in one of the beaded margins and about the forming band thereof, and extending diagonally in opposite directions through said core, in the other beaded margin and about the forming bead thereof, the looped end portions abutting each other within said beaded margin, and means connecting the looped end portions of the series of cords, combined substantially as described.

1,006632. Steel Connecting Rod. Lembert W. Coppock, Decatur, Ind., assignor of one-half to Jesse G. Niblick, Decatur, Ind. Filed Feb. 23, 1910. Serial No. 545,539.

A pressed-steel connecting rod for engines consisting of a central body portion formed of two longitudinal parts welded together, an eye at one end formed by centrally bending the material constituting said connecting rod and the other end of each welded half of said connecting rod spread in the arc of a circle, a semi-circular member, said semi-circular member having a tongue punched out of the same centrally, means for securing said member to the bifurcated end of the connecting rod, and a split bushing with ont half riveted to the spread end of the connecting rod and the other half provided with a hole that regis ters with the punched out opening through said semi-circular member.

1,006,650. Vehicle Wheel. Charles E. Goss, Robert Lee, Texas. Filed July 21, 1910. Serial No. 573,066.

1. In a vehicle wheel, an inner rim of channel formation, an outer rim of channel formation fitting the inner rim, springs interposed between the rims, a hub, and spokes spokes connecting the hub and inner rim, the material of the spoke being struck back throughout a definite area to form an opening and such area of material serving to close the inner end of the spoke and serve as a deflector.

1,006,659. Anti-Skidding Device for Automobiles and Similar Vehicles. August Hormel, New York, N. Y., assignor to Hormel Auto-Appliance Company, New York, N. Y., a corporation. Filed Jan. 31, 1911. Serial No. 605,727.

1. A device of the character described, comprising a vehicle, double spring toggles depending therefrom, an axle that pivotally connects the lower members of said toggles, a trailer carried by said axle, and means for automatically straightening the toggles upon a lateral movement of the vehicle to increase the frictional contact between the trailer and the road bed.

1,006,663. Carburetter. Albert Kugler, New York, N. Y. Filed March 17, 1909. Serial No. 483,985.

1. In a carbureter, the combination with a mixing chamber having a regular air inlet and suction outlet to the engine, of a supplemental air inlet in communication with the suction outlet, said supplemental air inlet having ports of different area in communication with the outer air, valves closing said ports and arranged to be lifted by the suction of the engine, and an adjustable bodily movable member common to said valves for positively controlling their lifting movement whereby the quantity of air passing through the ports may be varied.

1,006,662. Signal for Automobiles or Other Vehicles. George L. Knowlton, Philadelphia, Pa. Filed Oct. 6, 1910. Serial No. 585,669.

In combination with a brake lever, of a vehicle, of a signal comprising a casing having a display opening, a signal plate slidable vertically over said opening, a bracket projecting inwardly from the lower end of said plate, a pin carried by said bracket, a bell crank lever mounted in the casing and having one end bifurcated for movable and detachable engagement with the pin, the upper branch of said bifurcation being shorter than the lower branch thereof, a rod connecting the opposite end of the bell crank lever with the brake lever, and means for elevating the bifurcated end of the bell crank lever when the brake lever is released.

1,006,665. Cushion Tire. George H. Matteson, Toledo, Ohio, assignor of one-half to John M. Hayes, Toledo, Ohio. Filed Nov. 25, 1910. Serial No. 594,182.

1. A cushion tire comprising in combination with a wheel rim, a casing secured to such rim, opposing annular expanding members bearing outwardly against the internal walls of the casing, a band coacting at its opposite edges with said members intermediate their inner and outer edges to space the same apart and serve as a fulcrum for each member to permit lateral oscillatory movements of the members about such fulcrums at points of radial pressure thereon, and means removably holding said band and members in engagement.

1,006,667. Valve Mechanism for Internal-Combustion Engines. Antoine P. Plaut, Venice, Cal. Filed Aug. 3, 1908. Serial No. 446,693.

1. In combination with an internal combustion engine having multiple cylinders, a valve mechanism comprising separated exhaust and inlet valve casings for each cylinder a shaft extending and inlet valve said exhaust casings and through said inlet casings, individual rotary conical valves within said casings and mounted on said shafts to have longitudinal adjustment relatively thereto, means to operate said shafts, and an exhaust and inlet pipe to connect the valve casings of each cylinder.

1,006,686. Shock Absorber. William A. Schiller. Goodison, Mich. Filed June 1, 1911. Serial No. 630,642.

In a shock absorber, the combination with a vehicle frame and a spring therefor, provided at one end with an air inlet valve and escape ports, a closure for the other end of said cylinder, said closure having

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an extending arm the free end of which terminates in a lateral extension journaled in frame, a spring held piston slidable in said cylinder, a plunger plate mounted against rotation in said cylinder and slidable therein, one end of said plunger bearing against the piston, a disc shaped cam member rotatably mounted in said cylinder and having wedge cams adapted to engage with the free end of said plunger plate and actuate the same when the cam member is rotated, and means connecting said cam member with the spring of the frame, said means being adapted to rotate the cam member when said frame spring is distorted.

1,006,688. Retainer for Ball Bearings. Stefan Schneider, Chicago, Ill., assignor to The United States Ball Bearing Manufacturing Co., Oak Park, Ill., a corporation of Illinois. Filed Aug. 3, 1910. Serial No. 575,260.

1. A retainer for ball bearings, comprising a ring, and a plurality of approximately U shaped spacers on the ring, each spacer having both its legs in alinement with the same radius of the ring, said spacers being spaced equidistant apart on the ring and having their legs beveled on both faces toward their inner edges.

1,006,712. Tire Protector. Rudolph Aue, San Antonio, Texas. Filed Feb. 28, 1911. Serial No. 611,479.

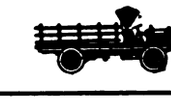
1. A tire protector comprising a strip of fabric for bearing over a pneumatic tire, a relatively narrow strip of flexible non-puncturable material bearing upon the fabric strip, a relatively wide strip of flexible non-puncturable material bearing over the narrower strip of non-puncturable material and in contact with the fabric strip, and means for independently securing said non-puncturable strips to the fabric strip.

1,006,747. Automobile Radiator. James H. Graham, San Francisco, Cal. Filed Jan. 21, 1911. Serial No. 603,832.

1. A radiator comprising a water receiving head and a foot chamber, spaced conductors connecting said water head and chamber, a covering for one side of the radiator conductors to prevent air from passing transversely through the radiator, a plate covering the opposite side of the radiator and terminating short of the water head so as to leave an opening for the admission of air between the spaced conductors, and means at the bottom of the radiator to effect the discharge of air from between the front and back plates.



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To get results for advertisers a trade paper must not only have real circulation, but it must have a lasting grip on its readers' attention.

The fact that The Bicycling World and Motorcycle Review can hold the interest of readers for the length of time indicated in THIS LETTER ☛ explains how it is possible to get for advertisers the results mentioned in the letter below.

Edward W. Staebler — Herman J. Staebler

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PHONES NO. 0

ANN ARBOR, MICHIGAN

April 11, 1912.

Bicycling World and Motorcycle Review,
1600 Broadway
New York City

Dear Sirs:-

Your letter of April 9th at hand. We are subscribers to your paper, in fact we have been for the past twenty-seven years, which goes back to the time of the old L. A. W. Bulletin which was the grandfather of your present paper. We have received the paper without interruption ever since.

We are pleased to note the change in the paper and wish to compliment you on this improvement. We like it very much.

Very truly yours
STAEBLER & SONS
PER E. H. S.

JOHN J. CHAPIN, President
ALFRED ROSEBOOT, Vice-President
JOHN J. BERKERY, Secretary
FRANK J. GORMAN, Treasurer

Detroit Bi-Car Company
613-614 Hodges Building
Telephone Main 4519

Detroit, Mich., April 9th

Bicycling World & Motorcycle Review
Mecca Building
New York City, N. Y.

Gentlemen:-

Just a line to thank you for the splendid description of the Detroit Bi-Car given us in a recent issue of your paper.

The results from this mention of our product have been a revelation to us. In all we have received over 400 inquiries from all parts of the country and many from abroad, showing that the Bicycling World and Motorcycle Review not only has a large circulation but is carefully read. We wish to assure you of our appreciation and beg to say that when we get ready to advertise, Bicycling World and Motorcycle Review will stand first on our list.

Yours very truly
Detroit Bi-Car Company.
John J. Berkery Secy

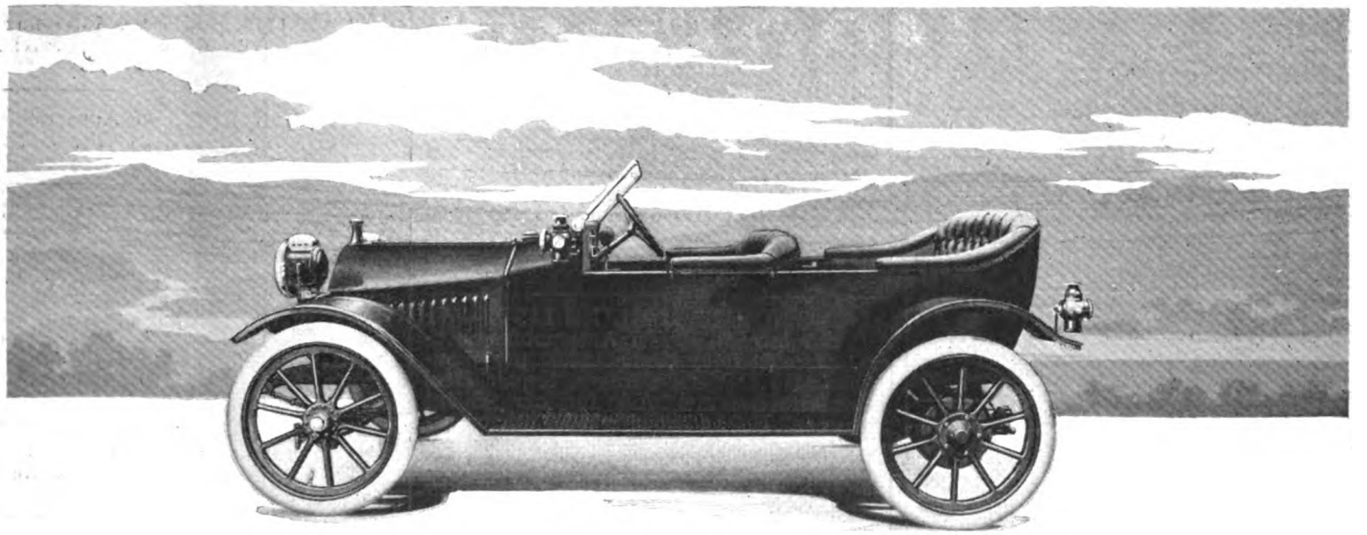
Over 35 years of continuous publication have gained for this paper the respect and confidence of the worth while people in cycling.

It is not only by many years the oldest, but it is the fastest growing paper in the cycling field.

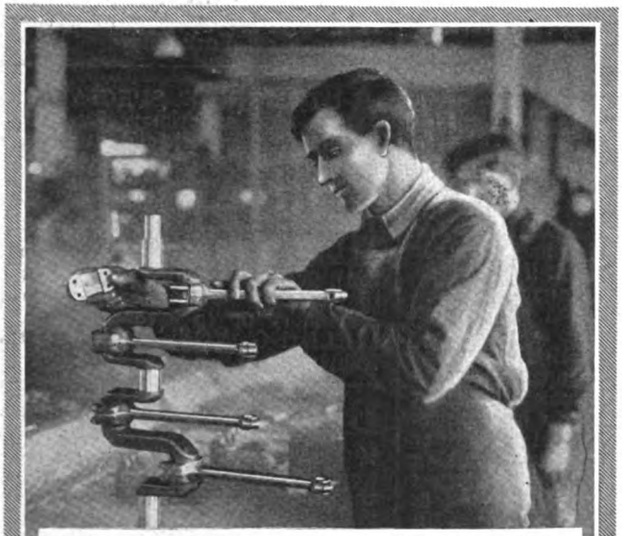
Up to the time of writing this advertisement—May 8th—2,531 new subscriptions have been received since January 1st.

The time to buy advertising is when its value is increasing.

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Long-Stroke "32" Touring Car, $900
F. O. B. Detroit, including equipment of windshield, gas lamps and generator, oil lamps, tools and horn. Three speeds forward and reverse; sliding gears. Four cylinder motor, 3¼-inch bore and 5½-inch stroke. Bosch magneto. 106-inch wheelbase; 32x3½-inch tires. Color, Standard Hupmobile Blue. **Roadster, $900.**



Here is shown the assembly of crankshaft and connecting rods; and the careful adjustment of the connecting rod bearings.

Please note the center main bearing and the extra-generous length of the two end bearings. A third crankshaft bearing is unusual in a motor cast en bloc, except in cars of $2,500 or higher.

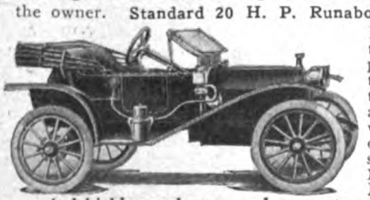
So, in the $900 Hupmobile, the crankshaft has three instead of two supports to help it withstand the strains to which this part necessarily is subjected.

Three main bearings give the shaft 50 per cent more support; they reduce friction, thereby promoting easy running and greater power development; they reduce very greatly the liability of bending and breaking the shaft.

The adjustment of the connecting rod bearing takes place in importance with the machining and grinding of the cylinders, the careful scraping of the main bearings, the assembling and adjusting of the multiple disc clutch, assembling of the three-speed transmission, and of the full-floating rear axle—all contributes to the smooth-running and the great power-efficiency of the long-stroke motor.

And all through, each separate part is tested and inspected, inspected and tested; the motors tested and run in on the block; the chassis tested on the road.

All this high grade construction, skilled workmanship, and vigilance to assure long service and satisfaction to the owner. **Standard 20 H. P. Runabout, $750.**



F. O. B. Detroit, with same power plant that took the world-touring car around the world—4 cylinders, 20 h. p., sliding gears, Bosch magneto. Equipped with top, windshield, gas lamps, and generator, oil lamps, tools and horn. Roadster, 110-inch wheel-base, $850.

Hupmobile

We believe the Hupmobile to be, in its class, the best car in the world.

That this belief is justified, is proven by the large proportion of Hupmobile sales that come through Hupmobile owners and their recommendations to others.

Evidently, no one has shown them a car as good or better in its class.

Hupp Motor Car Company

1254 Milwaukee Ave., Detroit, Mich.

Canadian Factory, Windsor, Ont.

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Wants and For Sale

15 cents per line of seven words, cash with order. In capitals, 25 cents per line.

BARGAINS—1911 Krits; 1911 Hupmobiles; 1910 Hudsons; 1911 Paiges; 1912 Westcotts; 1911 Stoddard-Daytons; 1911 Wintons. L. H. PRESCOTT, 33 Seldon Ave., Detroit, Mich.

STEVENS-DURYEA CARS—We have some of these cars to sell. They are new Model AA, strictly 1912, just received and fully guaranteed by the manufacturer. We also have a few of these cars that have been used some. They are guaranteed and good bargains. SPRINGFIELD AUTOMOBILE COMPANY, 40 Liberty St., Springfield, Mass.

WANTED—Superintendent. Man with thorough knowledge of the manufacture of leather tire treads and all factory costs connected therewith. Address, SUPERINTENDENT, Motor World.

FOR SALE—6 cylinder, 45 H. P. Fiat; late 1910 model; toy tonneau; demountable rims; Presto tank; top, full set lamps and headlights; perfect condition. E. DuP. MEYROWITZ, 104 East 23rd St., New York City.

FRANKLIN Touring Car, in excellent condition; have bought larger car; will sell cheap. L. L. FALES, 307 Dean St., Providence, R. I.

TOURISTS, does your auto need a bath? Try us. AUTO BATH GARAGE, 70 South St., Rochester, N. Y.

FOR SALE—240 acres good improved Geary Co., Kan., farm; price $50 per acre; will take good touring car in part payment. A. A. JAECKE, Herington, Kan.

AGENTS WANTED — To handle the $1000 G. J. G. "Junior," racy, classy and specially designed chaseabout with 104-inch wheelbase, with a real 26 H. P. motor, Bosch magneto, Dorian remountable rims with 32 x 3½ tires, at a price of $1,000, which is a money-maker for the sales agent. Write for literature and discounts to G. J. G. MOTOR CAR COMPANY, White Plains, N. Y.

ROCHET-SCHNEIDER, 1907; first class condition; just overhauled; Bosch high tension magneto; new 5 passenger body; would sell chassis singly; bargain. C. H. PECKWORTH, 631 Hudson St., New York.

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GARAGES—Portable-permanent, steel or wood. KNAPP SYSTEM, 123 Liberty St., New York.

THERMO-GASKET—Simple—Scientific—Efficient. No device on the market gives gasolene motors such power, silence, and economy, at so small a cost. Write for particulars. F. W. BATTERSHALL & CO., 53 Maiden Lane, Albany, N. Y.

NEUSTADT'S 1912 200-page Automobile and Motor Boat Accessory Catalogue, free for the asking. NEUSTADT AUTOMOBILE & SUPPLY CO., 3200-2-4 Locust St., St. Louis, Mo.

AUTOMOBILES cost too much; save $50 to $500 selling to yourself. Brand new, fully guaranteed 1912 cars, any model, any make, at liberal discounts. Referenced agent wanted every town. UNION MOTOR SALES CO., 3127 C. P. A. Bldg., Dayton, Ohio.

AUTOMOBILE MAILING LISTS—We can furnish 472,000 Automobile Owners, segregated by States, $2.00 per thousand. Also Dealers, Garages, Repair Men, Manufacturers, etc. Ask for our "Silent Salesman" No. 52, showing 2,000 other classified lists. It's free. TRADE CIRCULAR ADDRESSING CO., 166½ W. Adams St., Chicago. 'Phone, Franklin 1182. Established 1880.

MAGNETOS—An Unusual Offer. We have just secured 200 (only) brand new Remy Magnetos with coils which we are offering as leader at $18.50. Be quick; they won't last long. THE AUTO PARTS MFG. CO., Detroit, Mich.

MANUFACTURERS of Automobile Accessories—We propose opening a first-class supply store on June 1. Please submit proposition of whatever you have to offer us on a consignment basis. REO SALES AGENCY, Charleston, W. Va.

HAVE A NEW AUTOMOBILE!—For $2.10 you can refinish your entire car with Transparol. Money back if not satisfactory. Used by the leading garages. Am. Transparol Co., 50 Church St., N. Y. City.

CAN YOU SELL CARBURETERS? There is a wonderful opening for a high-grade, competent salesman who is not restricted in his ability to do big things. We have the finest commercial carbureter proposition on the market and are looking for a man who can take it to the biggest manufacturers in the industry and sell it. There is plenty of opportunity not only for salary but for an interest in the business to the man who makes good. No cash capital required—simply brains and a highly developed ability to sell. Address, CARBURETION, care of Motor World.

DEALERS—Get agency proposition for Cutting Cars. Write for information to CUTTING MOTOR SALES CO. OF CANADA, 76 Adelaide St., West, Toronto, Canada.

FOR SALE—1911 Hupmobile runabout, in excellent condition. P. W. WOOD LUMBER CO., Worcester, Mass.

PARCEL DELIVERY WAGON—Cadillac light delivery, late model, ready to give a year's service without spending any money; equipped with good tires; sacrifice at $325. BARNET, 509 7th Ave., New York City.

DELIVERY, 2,000 lb. Express Type—Rapid one-ton truck with express body, shed and tailboard, guaranteed, overhauled; practically new tires; ready to go to work with; will sell, account death, at $550. MRS. SIMPSON'S CAR, 511 7th Ave., New York City.

MAILING LISTS of automobile owners in Atlanta and several States. 303 Kiser Bldg., Atlanta, Ga.

BARGAINS in new 4 x 5 4-cylinder auto motors. Equipped. F. E. ALFORD, Goshen, Ind.

MAILING LISTS of Automobile Owners. S. H. CARROLL, JR., Albany, N. Y.

A TREMENDOUS SACRIFICE—A professional lady leaving city, indefinite period, will sacrifice Ranier 5-passenger 4-cylinder 30-H. P. touring car; top, folding windshield, high tension magneto, extra shoes, tubes, tools, etc.; $300; warranted perfect running order. MRS. STOUTENBERGER'S CAR, 1075 Intervale Ave., Bronx, two blocks from subway, New York City.

WANTED—Ardsley touring car; state price and condition. C. H. CURTISS, Naugatuck, Conn.

GASOLENE Rumble Seat Runabout; would make exceptionally fine truck; $100; also Cadillac Delivery Car, $100, running order. BINGHAM'S CHAUFFEUR, 1075 Intervale Ave., Bronx, near subway station, New York City.

AUTOMOBILE SPECIALTIES—Models and experimental work, electrical and mechanical, special auto parts, bearings, etc. AUGUST HORMEL, 587 Hudson St., New York City. Tel. 2873 Chelsea.

BROKEN CRANKSHAFTS, cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

BROKEN CYLINDERS, crankcases, etc., made good as new by welding at about ¼ cost of new parts. No charge unless weld is satisfactory. Write for references and complete information. WATERBURY WELDING CO., Waterbury, Conn.

ELMORE TOURING CAR, 1911, fully equipped, extra tires, warranted fine condition, like new, great roadster, price $750, act quick, send for full description. H. J. DANIELS, Norwich, N. Y.

SCORED CYLINDERS repaired, $12 each. No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. Better investigate and save money. References, testimonials, and full details on request. WATERBURY WELDING CO., Waterbury, Conn.

SALESMEN, one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. STURDY MFG. CO., 2637 Michigan Ave., Chicago, Ill.

GAS ENGINE Troubles and Installation, cloth, $1.00; flexible leather, $1.50. Automobile Troubles and How to Remedy Them, cloth, $1.00; leather, $1.50. Eight other practical and reliable mechanical books. Send for circular. CHAS. C. THOMPSON CO., Dept. B, 1126 S. Wabash Ave., Chicago.

FOR SALE—Mitchell Six—Cutting Forty. For information, address OWNER, 119 Railroad Ave., Carnegie, Pa.

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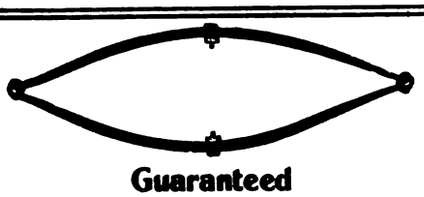
FOR SALE—Coupes for immediate delivery. Stylish, up-to-date and well constructed. Fit almost any car. Write us. ROBBINS & CO., Indianapolis, Ind.

WANTED—First class man thoroughly posted on Automobile Sundries—one competent to manage Sundry Department for large firm. Give reference, age and salary wanted, and past experience, which will be treated confidential. Address OMAHA RUBBER COMPANY, Omaha, Neb.

WANT a Stanley steamer, model 60, any condition. F. L. RICH, 3 George St., Roxbury, Mass.

FOR SALE—Five-passenger touring car. Inquire OPERA HOUSE, Ft. Madison, Iowa.

HAVE YOU TRIED the new cotter pin tool; no more skinning of hands; 15 tools in one, at $1.00. For sale by E. M. WORDEN, Ladysmith, Wis.



Guaranteed Automobile Springs

Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.

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Perfection Spring Company

SPECIALISTS IN

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High Grade Only

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OF QUALITY

For Motor Trucks

Jencick Motor Corporation
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Mosler Spit-Fire Are The Best

$495.00 METZ 22 H. P. MOTOR CAR

The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.

METZ COMPANY, Waltham, Mass., U.S.A.

INVADER OIL

"The Best the World Affords"

CHAS. F. KELLOM & CO.
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MOTZ Cushion Tires

For Pleasure Cars and Light Delivery Cars

Send for Booklet 58

THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio

BRANCHES:
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900 Woodward Ave., Detroit
9023 Michigan Ave., Chicago
600 E. 15th St., Kansas City
2252 Euclid Ave., Cleveland
Standard Tire & Rubber Co. 104-106 Portland St., Boston
Distributors for New England States

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

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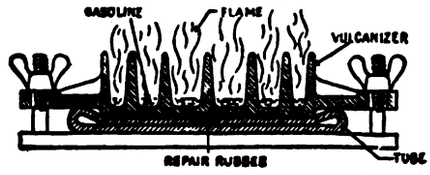
THE SPRINGFIELD TOP
(Pat. 1895)

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366 Birnie Avenue, Springfield, Mass.

The Inner Tube—Repair It Yourself

On the road, or at home—anywhere with

The Imperial Vulcanizer Repair Kit



Nickel Plated Patent Pending

One ounce of gasoline and a little rubber gives you practically a new inner tube in 15 minutes.

Price $3.50 Complete

At your dealers, or sent by express.

Guaranteed to Satisfy

Address Dept. E.

THE McGRAW TIRE & RUBBER CO.
East Palestine, Ohio

Third Annual Magneto Bargain Sale

Imported High Tension Magnetos at Less than Cost of Importation

Our third annual genuine inventory sale of U. & H. Master Magnetos, made in Germany, is now in progress. All H. P. sizes and types for 1, 2, 4 and 6 cylinder motors, suitable for motor cars, motor wagons, motor boats, motorcycles, stationary engines, etc. Write now, before they are all gone, for circular and price list. The sale is a real Magneto money saver.

J. S. BRETZ COMPANY
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Push Over Valve Press the Lever and It's Tight

Simple, Isn't It?

Grab Pump Connection

25c. at All Dealers or

MOTOR CAR EQUIPMENT Co.
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The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you cannot prevent skidding or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with Weed Chains.

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them on the front wheels too.

For your own safety—for the safety of the public, fully equip your car with Weed Chains. Make it your business to get a set today.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
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The Name "Weed" on Every Hook



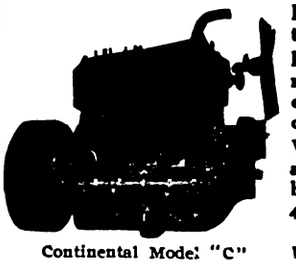
Why not try them?

UNITED STATES TIRES

are made with all the secrets of manufacture and all the elements of strength that four great manufacturers know.

UNITED STATES TIRE COMPANY
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"CONTINENTAL"



Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders 20 to 60 H. P.

Write for Booklets

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Class A for Electric Lighting
Class B for Electric Starting
Manufactured by
Willard Storage Battery Company
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Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.

(38) R. M. OWEN & CO., General Sales Agents
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GOODYEAR

This Name on Automobile Tires and Rubber Accessories Signifies Inherent Qualities of Material and Workmanship that Insure the Maximum of Service at the Minimum of Expense. (3407)

The Goodyear Tire and Rubber Co., Arthur St., Akron, O.

FEDERAL MAZDA

LOOK FOR THE LABEL
It's always on a good "MAZDA" Lamp
Federal Miniature Lamp Works
of the General Electric Co.
Chicago Cleveland

Locomobile Cars for 1912

Complete information furnished on request.

The Locomobile Company
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Woodworth Treads

will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
LEATHER TIRE GOODS CO., Niagara Falls, N. Y.

We Specialize on
Finishing Crank Shafts
Only.
MICHIGAN CRANK SHAFT CO.
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All Standard Bearings

are fully described in our
New Catalog 24 A
Send for it.
Standard Roller Bearing Company
PHILADELPHIA

75% Increase in Tire Efficiency

That's what the INNERSHU accomplishes. It's a tough, durable, rubberized fabric formed permanently to tire shape. Ask for circular.

INNER SHOE TIRE COMPANY
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Save Those Tires

You can make your tires wear years instead of months—no tire troubles—no repair expenses—no delays. Free Book on request tells how you can get full motoring pleasure with STANDARD TIRE PROTECTORS



Saving 90% of motor car up-keep costs. Dealers: 20% lower prices this year—and bigger discounts to you. Prepare to fill rush of orders.
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The Ear of the World

is difficult to attain in days like these. To get it one has to have a mighty strong voice and a mighty good proposition back of it.

The Typhoon is the "If you please" signal—loud, commanding and insistent—but not harsh and irritating.

We have no quarrel with the fellow who buys a horn to match his disposition—and if he prefers to add to the irritation of the already nerve-racked public that jumps and swears at the angry snarl of some of these latter-day noise makers—well, all right.

MANUFACTURERS AND DEALERS—The Typhoon signal, motor driven on the vibratory principle, has a deep, penetrating voice—different and more effective than any other.

A signal with the "scare note" carefully removed.

Consumes 50 per cent. less current **Lasts 100 per cent. longer**
Makes 50 per cent. more noise **Costs 100 per cent. less**

than any other electrically operated device.

The price feature alone will appeal to the manufacturer who wants to add value to his car at a minimum of cost—and to the dealer who realizes that the day of high-priced signals is getting along "toward evening."

TYPHOON SIGNAL COMPANY

1305 Michigan Ave. **Chicago, Ill.**

IF YOU ARE INTERESTED IN

MOTORCYCLES

THE BICYCLING WORLD
AND MOTORCYCLE REVIEW
WILL INTEREST YOU

PUBLISHED EVERY SATURDAY AT
1600 BROADWAY, NEW YORK

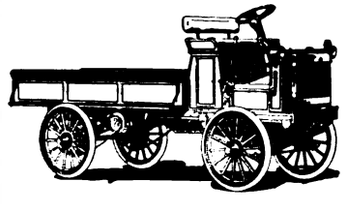
$2.00 Per Year *Specimen Copies Gratis*

ARE YOU in need of any additional help in any department of your business? Are you out of employment or looking for a better connection? Have you second-hand apparatus of any kind or do you want to buy second-hand material? Have you a factory site for sale or do you want to buy one? If so, use the Want and For Sale column of the Motor World. Seven words to the line, fifteen cents a line. Advertisements can be inserted over a number when it is desired and the identity of the advertiser will be kept confidential

Sanford

Unfortunately there is but one competitor to Sanford Trucks

Chassis $1600



Stake or Express Body $1750

We're sorry about this in a way, for it narrows down our possible comparisons. But it makes it pretty easy for our representatives. There never has been a selling proposition in the field that can compare with the Sanford.

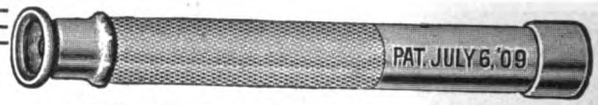
Nine long years' work on a one-ton truck gives you today this proposition, the success of which there is no gainsaying. There isn't a thing about this truck that's strange or freakish. Its success is not remarkable because of anything unusual.

The Sanford truck is remarkable only because it is so certain to do more than you'll claim for it that your repeat orders will be more or less automatic.

The Sanford Motor Truck Co.

SYRACUSE, NEW YORK

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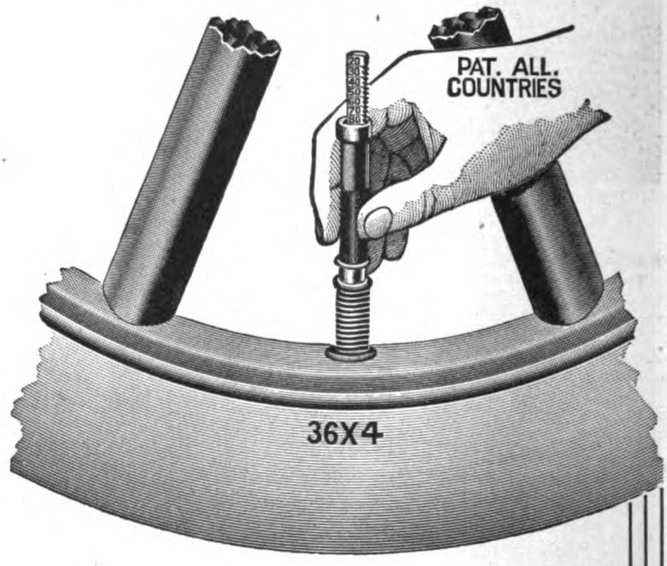
TWITCHELL AIR GAUGE

No motorist would hesitate a moment

in buying the **position lock stop** TWITCHELL AIR GAUGE if he knew it was going to save him a new set of tires. **Tire expense** is the motorist's kill-joy. Any device to effectively reduce that expense has a value out of all proportion to its cost.

Such a device is the TWITCHELL AIR GAUGE. With it the motorist has ever ready at hand a means to determine if his tires are inflated to the right pressure. If they are not, and he doesn't know it, he is on the high road to tire ruin. Because a tire which runs flat for even a few feet may be wrecked beyond repair.

The TWITCHELL AIR GAUGE tells you in one minute if your tires are in danger. Simply hold the gauge to your valve and the indicator informs you what your tire pressure it. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.



Price $1.00 Each May Be Obtained at All Dealers

THE TWITCHELL GAUGE COMPANY

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AJAX TIRES

(Guaranteed 5000 Miles)

The Full Measure Tire

Take advantage of the Ajax 5000 Mile Guarantee and you gain 1500 miles in tire service. Thousands of others are obtaining this additional tire service; why not you?

Ajax Tires cost no more than other standard makes but the longer guarantee and the liberal treatment of customers, coupled with the high quality of material and workmanship mean much greater value to you.

TO DEALERS: By keeping a complete assortment of sizes in stock you will be able to supply the ever increasing demand for Ajax Tires without causing delay to your customers.

AJAX-GRIEB RUBBER CO.

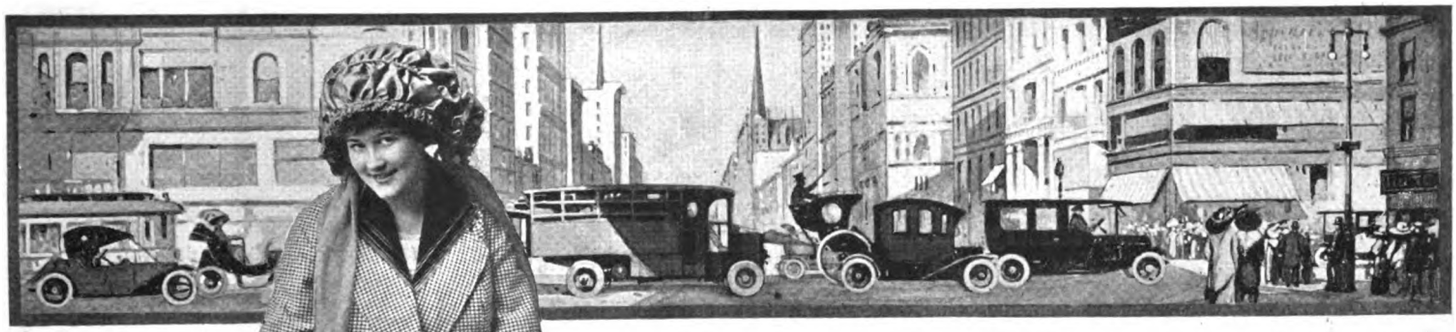
General Offices: 1796 Broadway, New York
Factories: Trenton, N. J.
Branches in Principal Cities

Ford
THE UNIVERSAL CAR

A tireless car — almost. Prisoners of "here" find freedom in the Ford. It's the always-at-your-service car—and a real tire trouble emancipator—for it puts more tire surface on the ground per pound of car than any other. And we're making seventy-five thousand this year.

All Fords are Model T's—all alike except the bodies. The two passenger runabout costs $590—the five passenger touring car $690—the delivery car $700—the town car $900—f. o. b. Detroit, completely equipped. Get latest catalogue from Ford Motor Company, Detroit, Mich.

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Kelly-Springfield Tire Company
20 Vesey St., New York

Branch Offices in
New York
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Boss Rubber Co. Denver, Colo.
Appel & Burwell Rubber & Tire Co. Dallas, Texas
Todd Rubber Company New Haven, Conn.

Second hand experience is just as efficient and infinitely cheaper than first hand.

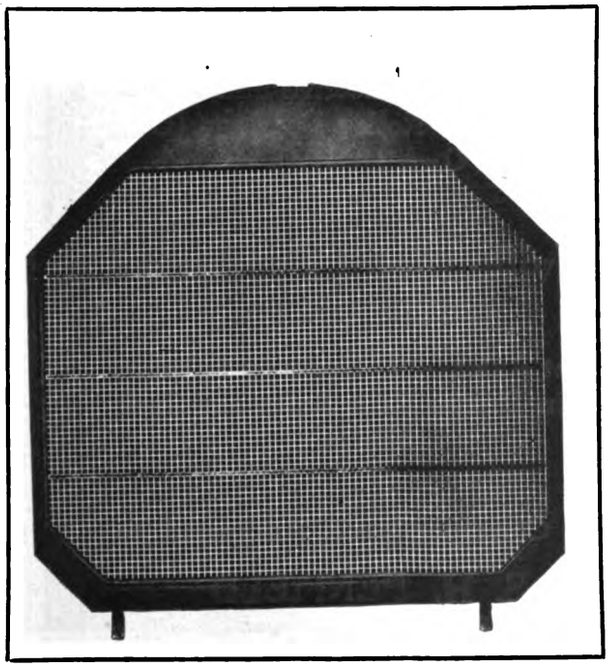
Take your tire experience from what others have learned at great expense on other tires, and get your tuition free. Get the **best** tires **first** by getting

Kelly-Springfield Automobile Tires

The name "Kelly-Springfield" on a tire stands for the same quality of rubber compound, the same tire-making experience, and the same care in manufacture, that have, for sixteen years, made the Kelly-Springfield solid vehicle tire the best of its kind.

Kelly-Springfield Tire Company, New York and Akron, Ohio

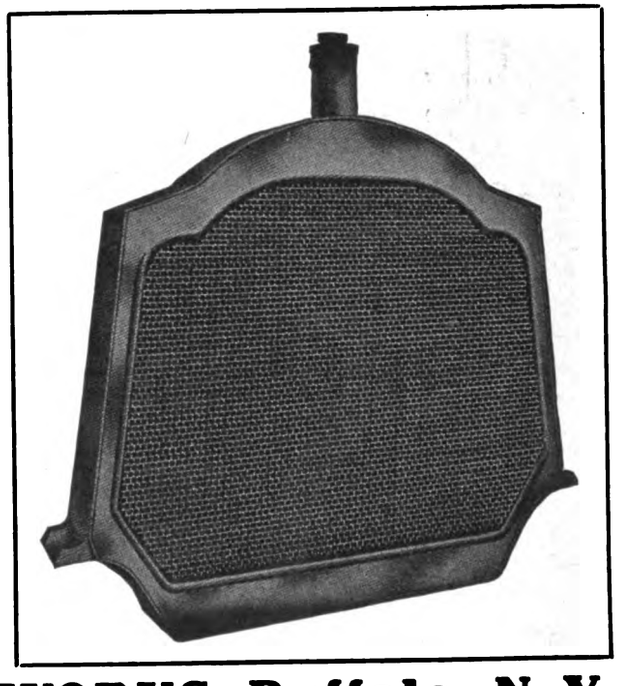
FEDDERS REAL SQUARE TUBE RADIATORS



No square tube "effect" or imitation, but made of individual square tubes. Of course the real square tube is better, that's why the others imitate it in appearance. They can't make the real article at the price.

Furnished with tubes staggered or Mercedes finish, as shown on cuts.

See Fedders Radiators on such cars as Packard, Thomas, Pierce, Haynes, Matheson, National, etc.



FEDDERS MANUFACTURING WORKS, Buffalo, N. Y.

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Do they act instantly or are they giving trouble? Your life, the lives of your family and friends may depend on the efficiency of your brakes.

Nothing is so important as quick acting brakes of maximum surface. Reliable brakes will stop your car with slight pressure—within the car's length.

DUPLEX EXTERNAL BRAKES

Act instantly. Whether car goes forward or backward. They grip and hold. They are made by brake experts. Have largest braking surface. Slight pressure does the trick.

Ask us what a set will cost for your car. We build brakes to order. Send us your specifications. Let us help you with your brake troubles. We'll be glad to lend our advice and assistance. Write today for catalog.



We also manufacture Raybestos, Raymond Brakes and Gyrex Mixer.

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BRIDGEPORT, CONN.

Salisbury Wheel and Manufacturing Company

and its allied corporations who are prepared to manufacture and make prompt deliveries of materials classified as follows:

Salisbury Wheel & Mfg. Co.

JAMESTOWN, N. Y.

Shaft Drive Rear Axles. Propellor Shafts. Jack Shafts for Commercial Vehicles up to 2000 lbs. Hubs and Wheels.

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PERU, IND.

Light Shaft Driven Rear Axles. Transmissions, Selective and Planetary Types. Roller Bearings (Our Own Design).

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Front Axles—"I" Beam or Tubular. Chain Driven Rear Axles and Jack Shafts.

All Correspondence Addressed to

S. H. PENFIELD

General Sales Manager

JAMESTOWN, N. Y.

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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

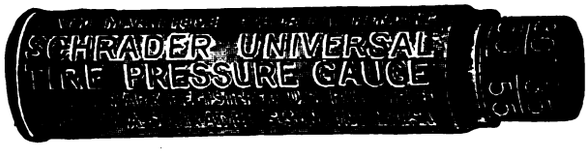
He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

Diamond Tires

We could build them cheaper But We Won't

We would build them better But We Can't

ANOTHER good reason why you should sell Diamond Tires is this:

¶ No Diamond dealer ever has a chance to complain about Diamond service to dealers.

¶ The Diamond policy is co-operation. You get Diamond service regardless of the number of tires you buy. The small dealer is as important to us as the largest.

¶ If you sell Diamond Tires you not only sell the best tires made, but you get sizes and styles that you need when you need them, and they are always clean, new fresh tires.

If you are not getting our little magazine for dealers, send your name in today. Your name should be on our list and we want it there.

The Diamond Rubber Company
Akron, Ohio

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BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY **DURABILITY**

One, Two and Three Ton Capacity

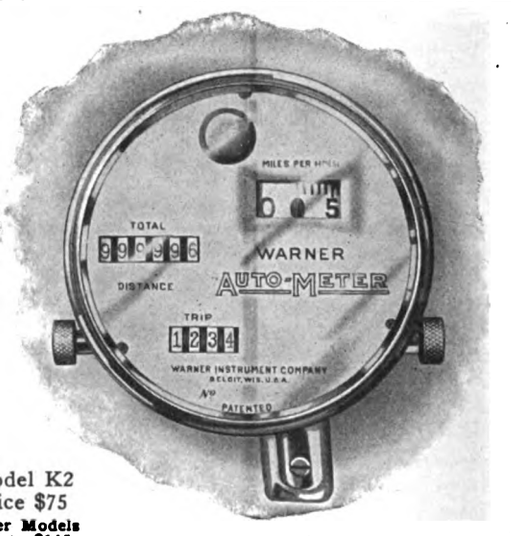
LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

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Model K2
Price $75
Other Models
$50 to $145

WARNER AUTO-METER

"The Aristocrat of Speed Indicators"

THOSE in other cars and who pass an Auto at the curb, say, "That must be a good car. See! It has a Warner on the dash!" The Warner is the Hall Mark of Quality on an Auto.

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Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
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"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.

Marion

The Dealer's Cue for 1912



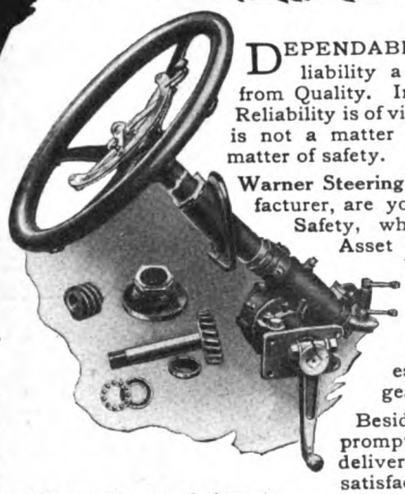
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MARION "35" Five Passenger Touring Car	$1285
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Efficient-Reliable Steering Gears



DEPENDABILITY and Reliability are inseparable from Quality. In steering gears, Reliability is of vital importance. It is not a matter of money—it's a matter of safety.

Warner Steering Gears, Mr. Manufacturer, are your best pledge of Safety, which means a Big Asset in your business. You are justified in using them by our eight year old reputation for building the highest grade steering gears produced.

Besides, we give you prompt and dependable deliveries, service and satisfaction. Write.

We modify our designs to meet your detail requirements, or build to approved designs on seasons quantity specifications.

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Philadelphia Office
Glenwood Av. and 2nd St.

Warner Gear Co.
Muncie Indiana

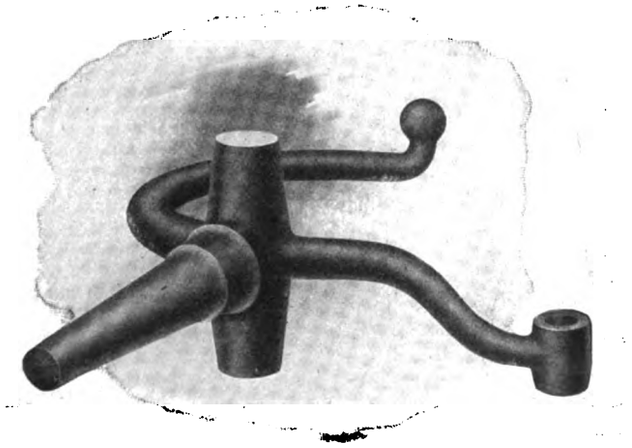
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Magnetos and Plugs

THE simplicity of the Bosch ignition system, its dependability and longevity have convinced even the inexperienced of its superiority over other ignition methods.

Over a million know it to be perfect

BOSCH MAGNETO COMPANY
223-225 West 46th Street NEW YORK
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PIONEERS

in making and treating

Drop Hammer Forgings

We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

PORTLAND ORE SAN FRANCISCO CAL LOS ANGELES CA

HOWARD AUTOMOBILE COMPANY
957-961 SOUTH OLIVE STREET

AGENTS AND DISTRIBUTORS Buick AUTOMOBILES FOR PACIFIC COAST

LOS ANGELES, CAL.,

Remy Electric Company,
Anderson, Ind.

Gentlemen:-

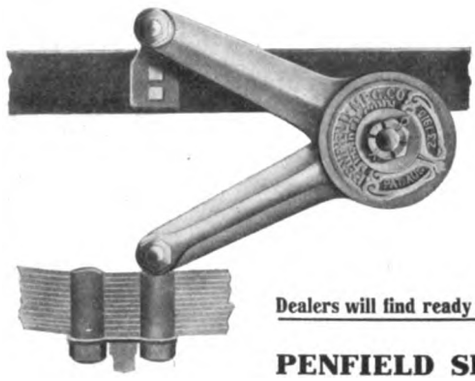
We write this letter to express our appreciation of Remy service generally.

The fact that your Company has established service stations throughout the country certainly should be appreciated by manufacturers, dealers and users.

Yours very truly
HOWARD AUTOMOBILE COMPANY.
Per H. Howard

A postal will bring account of letters like these
Remy Electric Co
Anderson, Ind.

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The Penfield Shock Absorber

Compensating Spring, shown here as attached to car, operates through a triple circular coil, positively absorbs both shock and recoil—eases the springs under all conditions.

Saves riders, power plant, springs and tires, conducing comfort and preventing wear and tear.

Cannot Break — Needs No Adjusting — Has Absolutely No Wear

Dealers will find ready sale for this shock absorber.

Standard for cars over 3000 lbs., per set of four, $50.00.
For cars less than 3000 lbs., per set of four, $45.00.

PENFIELD SHOCK ABSORBER MFG. CO., 51 Randolph Ave., Meriden, Conn.

The Hotel of Comfort

The WOODSTOCK

"You can walk from there to anywhere"

Our new addition is ready for occupancy.
We now have 360 rooms with 265 baths.
Write us for descriptive folder with typical floor plan and rate card.
Wire for reservation at our expense.



RATES

Court room with bath, for one, per day.....$2.50
Court room with bath, for two, per day..... 3.50
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W. H. Valiquette, Manager.

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"THE BERWICK"
Rutland, Vermont

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TELEPHONE 81 SPRING
ESTABLISHED 1871

The New Type of Electric

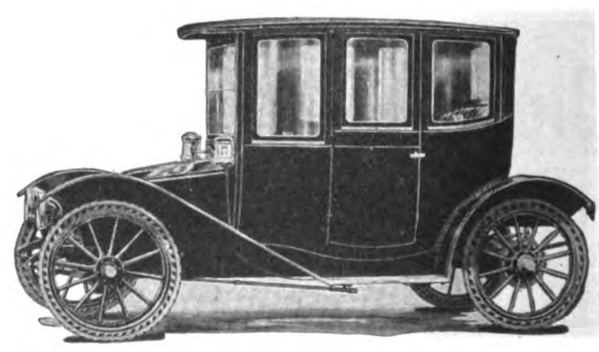
The Argo is setting new standards for builders of electric motor cars. Long and sweeping in lines—beautiful in finish—with luxury apparent in every detail, it attracts instant attention wherever it goes.

The Argo is different from the old style models—the body is not perched upon the chassis—it it swung low between the axles, with only 5 inches from curb to step. This low-hung construction gives not only the fine French lines, but low center of gravity. Swaying is impossible—skidding is reduced to a minimum—it is a radical departure from the old type of top-heavy, awkward, electric car.

ARGO ELECTRICS

The wheel steer of the Argo is handier—the only safe and sure steering method for rough and slippery roads—the silent, chainless, geared drive is more efficient—the long wheel base, large wheels and improved springs makes it ride easier than any other electric built.

AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both



ARGO ELECTRIC VEHICLE CO.
1201 S. Jefferson Avenue · SAGINAW, MICH.
Chicago Salesrooms—2412 Michigan Avenue

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WINTON SIX

Three Classes of Buyers

We sell Winton Six cars chiefly to three classes of buyers: 1—Those who have owned Winton cars. 2—Those who have owned cheap cars and now want quality. 3—Those who have owned highest-priced cars and now want best quality at lowest cost.

Shall we send you our literature?

THE WINTON MOTOR CAR CO.

426 Berea Road **Cleveland, O.**

The World's First Makers of Sixes Exclusively

Empire Twenty-Five

The Little Aristocrat

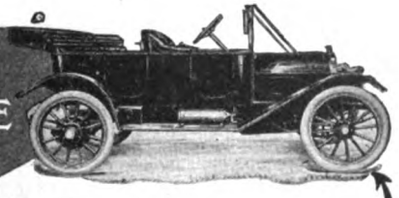
This is the Big Brother of the Famous Empire Roadster and is a **small edition** of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.

224 Massachusetts Street **Indianapolis, U. S. A.**

The Car THAT HOLDS THE CONFIDENCE OF ALL Glide



36-42 H. P.
Complete Equipment
$1550.00

From the standpoint of actual service, utility and equipment, the "Glide" has won the confidence of all. First, the dealer handling the "Glide" has a car that he can sell with the assurance that it will satisfy the purchaser; second, the buyer actually gets more real automobile worth and efficiency out of the "Glide" than he can obtain from cars costing nearly twice the price. Send for handsome book and learn why the "Glide" is best. 5 to 7 years actual service is one reason—but there are many others.

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A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.

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TOURIST
4-Passenger
$2,700
Fully Equipped
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Stock Champion **Road Race Champion**



Five Passenger Touring Car, Series V, $2,900

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If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY

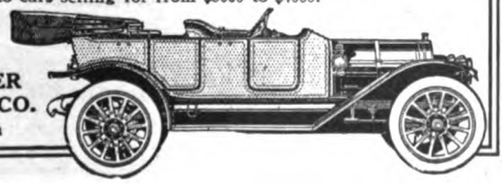
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See our free Table of Comparative Motor Car Values—It will make you a posted purchaser and enable you to form an estimate in your selection of a car that is conservatively the most for the money. **Cutting cars cost less per Horsepower and per Wheel Base Inch than any other automobile selling for $1200 or more.** In point of design, workmanship and finish they are equal, and in some cases superior, to cars selling for from $3000 to $4000.

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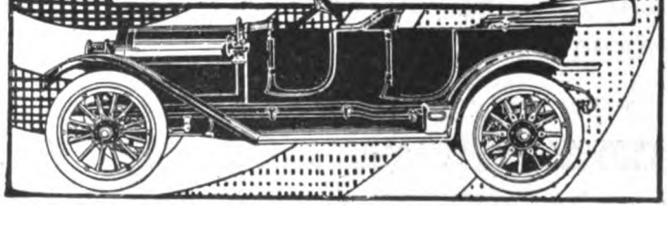


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Ward Leonard Dynamo Electric Lighting System, Self Starter, Unit power plant; 4½" x 5½" motor, enclosed valves; Bosch ignition; Timken axle equipment; 35 x 4 in. wheels; demountable rims; 122-in. wheelbase; nickel trimmings; Seven bodies. $1985.

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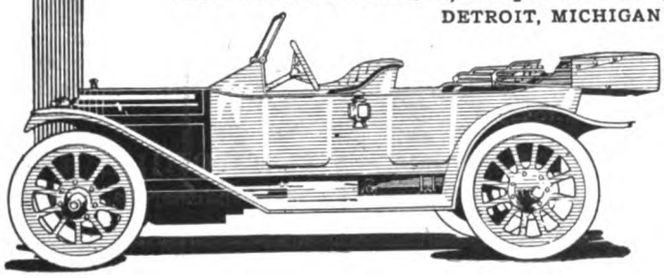
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Two types, a five-passenger touring car on a four-passenger torpedo-phaeton — six cylinders, thirty-eight horse-power.

Wheel base 123 inches—ample room for comfort but easy to handle.

Full-elliptic springs and a wood frame—road shocks are absorbed.

Sheet aluminum body—light weight and will not rust, check or crack.

Tires 36 x 4½ inches front, 37 x 5 inches rear—larger than any other car of this size.

Price $3500 for either type.

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Now Closing 1912 Contracts

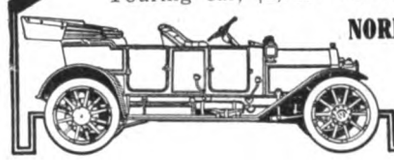
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The Easiest Riding Car in the World

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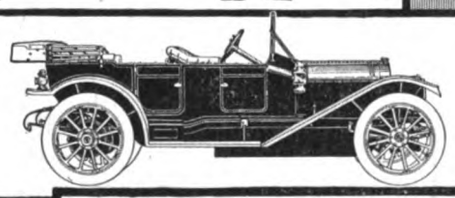
A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



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Every Inch a Car



$1500
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for commercial cars have always proven successful.

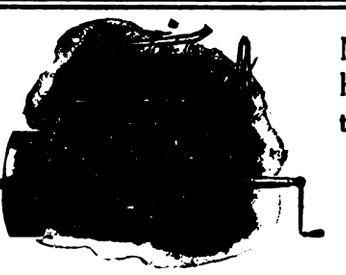
They will stand the severest tests and all we ask of you is to let us demonstrate this fact on your own car. Your inquiries will be given every consideration.



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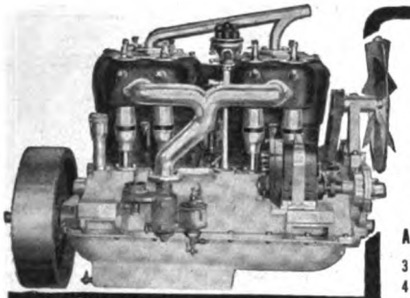


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It has made more reputations and broken more records than any other motor.

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Superior Features

Large Bearings
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ALL 4 CYCLE — 5 TYPES

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WISCONSIN MOTOR MFG. CO.
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The superiority of

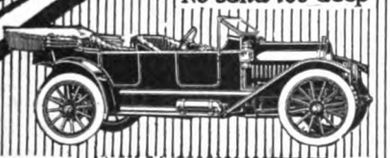
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is conclusively proven by the fact that they are used in the leading cars throughout the world.

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MODEL 52 $1800.
" 45 $1650.
" 32 $1100.
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" 28 $1000.

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If You Need Motor Lamps
You Need This Catalog

We want you to write for the Solar Catalog before you decide on your motor lamps, for this is the most complete line of lamps on the market. Solar Lamps have been preferred by most motorists for the past fourteen years because of their brilliancy, their style, their strength and their several exclusive advantages—their special short focus lead glass lens mirror reflectors—the patented double ray light projection (in the Solarclipse), giving two distinct fields of light, for city and country use—the new black finish, the only such finish that's proof against heat and moisture—and other features that other lamps lack.

To fail to see Solars before you buy is to fail to include in your consideration the very finest lamps in existence. Solars are made for oil, electricity, gas and in combination, for pleasure cars, motor trucks, carriages, motor boats and airships. Write for catalog now—while you think of it. (136)

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Mais Motor Trucks

Internal Gear – Not Chain – 1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

Dealers Will Receive Personal Attention

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M & P

1000 Lb. Electric Truck Standard in Every Detail

Sets a new mark in quality, service, efficiency and economy.

Bare Chassis including Driver's Seat $1450 Express Body $1500 Panel Body $1600

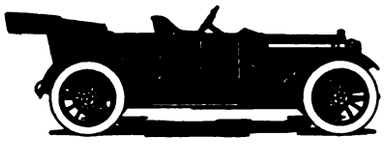
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Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

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A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

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The Motor With the Sliding Crescent Valve
KNIGHT-DAVIDSON
1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

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Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
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SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE
Makes a Big Winner in Philadelphia
Our Philadelphia Agent writes it is a Great Success.

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Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,
H. SCHROEDER,

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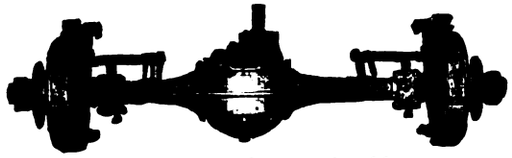
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American
AXLES

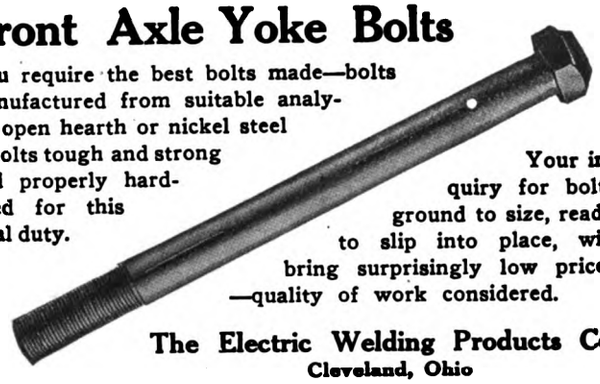


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Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

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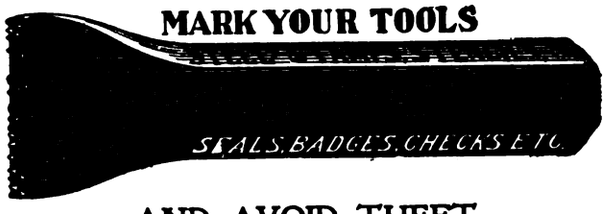


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Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

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AND AVOID THEFT

Take advantage of this special offer, which lasts for 30 days: Upon receipt of cash with order we will make your stamp for 10 cents per letter. Send us your order now.

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TRUCK FRAMES
Automobile Frames and Special Stampings

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

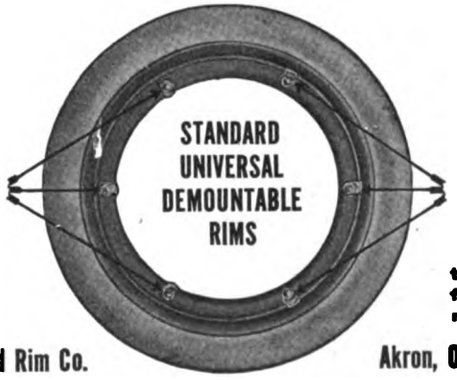
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START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

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Two Turns UNLOCKS the Rim for Demounting

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4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500

(Completely Equipped)

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The Electric Car of Quality

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Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

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The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS SIX — HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

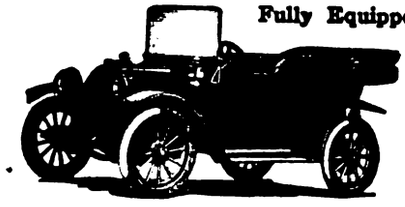
Full specifications sent on request.

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The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

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Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
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Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

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Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

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Motor Car Manufacturers Since 1893

HAYNES

1912

Occupying the newest and most modern automobile manufacturing plant in America.

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SOLD EVERYWHERE

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IT'S GUARANTEED
Price
$3.50
With Decarbonizer
High Power Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

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Manufacturers of High Grade
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Send for catalog, price-list and specification sheets of sizes.

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Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.
The Wm. Cramp & Sons Ship and Engine Building Company
PHILADELPHIA, PA.

It's Great
to be a
McINTYRE AGENT

Established, able dealers are invited to write for information as to open territory. Both pleasure and commercial cars.

W. H. McINTYRE CO., Auburn, Indiana

Sheet Metal Stamping

WE HAVE an exceptionally complete equipment for the manufacture of special shapes from sheet metal including heavy and difficult cold drawing and forming work of Automobile and Motor Truck Parts, such as Step Hangers, Brake Drums, Axle Housings, Torque Arms, Hood Supports, etc. Send us your blue prints. Estimates cheerfully furnished.

THE BOSSERT CO., Utica, N. Y.



Patented Sept. 5, 1911

NEWTONE
The Mile-Away
MOTOR HORN
Torpedo Type
Once Hear It and You'll Want No Other
The Most Perfect Warning Signal
EFFICIENCY and ECONOMY
Price $20 Complete, Including Button and Cable
AUTOMOBILE SUPPLY MANUFACTURING COMPANY
220 Taaffe Place Near DeKalb Avenue BROOKLYN

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"Buy Kline Kars First Because Kline Kars Last"

Durability, Economy, Reliability, Power and Speed make our satisfied customers.

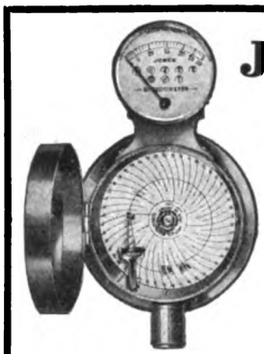
4 Speeds Forward **KLINE KAR** Self - Starting

MR. DEALER, GET WISE—A line of high grade cars at prices that people are paying for cheap cars. Write us today.

4-30	$1700 $1750	4-40	$2200 $2250	6-50	$2800 $2850	6-60	$3300 $3500

All Models Completely Equipped.

KLINE MOTOR CAR CORPORATION, York, Pa. Factories: York, Pa. Richmond, Va.



JONES RECORDER

Gives time, speed and distance. Number of stops—length of each stop. Complete record of every movement or stop of vehicle marked on chart. Absolutely essential to all operators of motor trucks or delivery wagons.

The Jones Recorder consists of a strong brass casing, containing a clock work and flexible shaft from the drive wheel of the vehicle.

THE JONES RECORDER
Broadway and 76th Street New York

Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.
R. B. ABBOTT SALES CO., Sales Agents, Detroit

Best on Earth — Kantsamore
ESTABLISHED 1855

Phineas Jones & Company

305-313 Market Street, Newark. N. J.
Branch Factory: 12th Avenue and 55th Street, New York City

Automobile Wheels

For Pleasure Cars and Trucks

Repairing and truing old wheels a specialty. Experimental wheels a specialty. We furnish and apply any style demountable or detachable rim or tire.



"Firestone" Tires and Rims

are the least likely to require changing, and afford the best means of tire changing when required.



The Firestone Tire & Rubber Co., Akron, Ohio
and All Principal Cities



Regular Type $1

Unless your spark plugs resist soot and carbon, they are not up to the

Reliance

standard of efficiency.

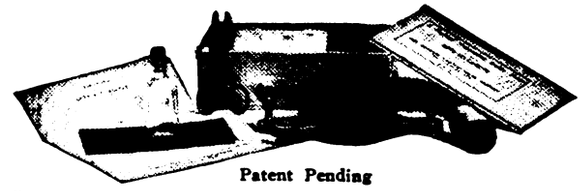
Ninety per cent. of all engine troubles can be traced to the ignition system—a better understanding of this system helps.

Our free book, "Ignition and Spark Plug Talk," explains everything. Mailed you on request.

JEFFERY - DEWITT CO.
65 Butler Avenue Detroit, Mich.
Largest Spark Plug Manufacturers in the World

WARNING

PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

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Term "Little Six"

"The finest little car I ever rode in."

"The 'Little Six' is here, it is attracting even more attention in our salesroom than did the 'big six.'

"My first ride in this car was from the railroad depot to the store, and as we had forgotten to bring a license tag we were forced to drive up through all back streets and on the roughest pavement in the city, but at all times did not receive any uncomfortable road shocks. It is the finest little car I ever rode in, and I wish to congratulate its designer."

R. C. Albertus
W. J. Marshall Automobile Company
703 Woodward Avenue
Detroit, Michigan

"Fifty-five miles an hour to four on high gear and not a quiver."

"The 'Little Six' is certainly the greatest little car on the market today, and if all the people who are thinking of buying a motor car could be induced to take a demonstration there would be no break in production at the factory for the next year, either night or day.

"With the windshield up, we showed fifty-five miles an hour on a Warner speedometer, a few days since, and did not go the limit either, and it could be throttled down to four miles an hour, on the high, without a 'quiver.'

"Everyone who rides in it is delighted, not only with its performance, but its appearance."

Glenn A. Tisdale
Franklin Motor Car Company
73rd Street, Broadway and Amsterdam Avenue
New York City

"The little Greyhound."

"The 'Little Six' is a perfect dream. It is just the sweetest thing I ever drove. Powerful, flexible, comfortable, quiet, fast over American roads—the little Greyhound of automobiles."

D. F. Pfoutz
Chambersburg Automobile Company
2 North Second Street
Chambersburg, Pennsylvania

"100% better than I expected."

"We are in receipt of the 'Little Six,' and to state that we are delighted with the same would be putting it mildly. This car was sold and delivered to Mr. C. T. Miller, this city, who has been driving a ————, and in his estimation there is no comparison between the relative valuation of the two cars. He even goes so far as to state that although he expected a great deal of the Franklin, it is 100 per cent. better than that."

W. D. Sweet
Eureka Motor Car Company
210-220 Adams Avenue
Scranton, Pennsylvania

"Has all others backed off the map."

"The 'Little Sixes' are beauties and are attracting great attention in Walla Walla. No other car of any make ever shown here performs so perfectly and runs so quietly around the streets. In our opinion the Franklin 'Little Six' motor has all others backed clear off the map when it comes to smooth, quiet, slow pulling.

"The even engine torque of the six-cylinder motor is so perfect as compared with that of the four-cylinder that no dealer ought to let a prospective buyer who can pay the price get away from Franklin 'Little Six.'

"We have already sold seven 'Little Sixes' and delivered six since the first shipment arrived about two weeks ago. If you find any dealers who can not move their 'Little Sixes' tell them the Walla Walla dealer is begging with tears in his eyes for some more 'Little Sixes' that can be had quick."

R. H. Tuttle
Franklin Motor Car Company
Walla Walla, Washington

We are going to secure a dealer in every important town where we are not represented. The "Little Six" will be a good leader for you to start with. Why not write to us?

FRANKLIN AUTOMOBILE COMPANY Syracuse N Y

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EXPERIENCE – SHELDON – RIGHT DESIGN
FACILITIES – AXLES – RIGHT STEEL

"Made in the Largest Axle Factory in the World"

Axle Talk—No. II

It does not matter how well an axle may be designed if it is not well built.

The best axle in the world will not live up to its reputation if its design is faulty.

A poorly designed axle may embody strength but carry much excess weight within itself. It may, through incorrect proportioning of steel, have every appearance of strength, but develop weak points. It may be graceful, but lack important qualifications necessary to give service.

The SHELDON Engineering Department occupies a position of dignity and responsibility in keeping with the importance we attach to design.

We employ the highest salaried engineers and designers in the whole field, because we realize the importance of correct design as it affects the finished product.

SHELDON axles, correctly designed, embody maximum strength and good looks—a combination often hard to achieve.

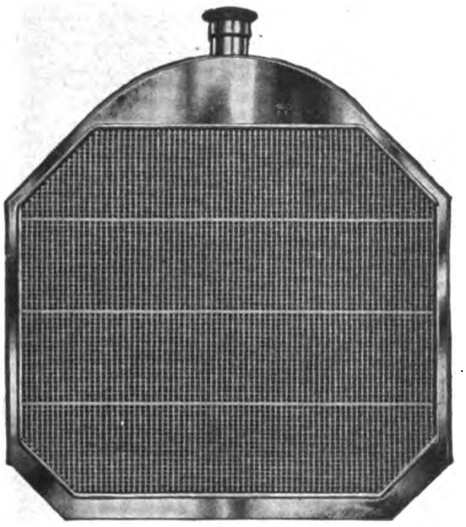
Our engineering staff stands ready to solve your axle problems. Their combined knowledge insures you correct specifications covering every phase of stress, weight, tread, road and distribution. This service is yours to command at no cost to you.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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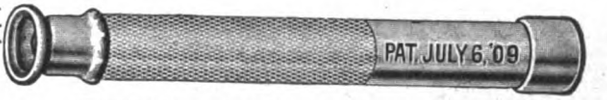
The Mayo—the radiator thoroughbred

¶Mr. Car Owner—Did you know that your insistance upon having the Mayo Radiator as part of your automobile equipment has all to do with the operating efficiency of the car? It does.

¶Mr. Dealer—The wise, thinking car owner of today is waking up to Mayo Radiator efficiency. Do you supply it?

Mayo Radiator Company

NEW HAVEN, CONNECTICUT



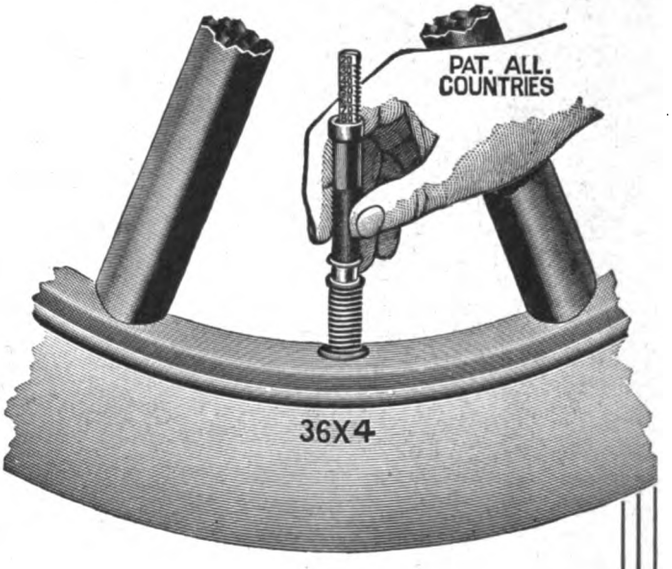
TWITCHELL AIR GAUGE

No motorist would hesitate a moment

in buying the **position lock stop** TWITCHELL AIR GAUGE if he knew it was going to save him a new set of tires. **Tire expense** is the motorist's kill-joy. Any device to effectively reduce that expense has a value out of all proportion to its cost.

Such a device is the TWITCHELL AIR GAUGE. With it the motorist has ever ready at hand a means to determine if his tires are inflated to the right pressure. If they are not, and he doesn't know it, he is on the high road to tire ruin. Because a tire which runs flat for even a few feet may be wrecked beyond repair.

The TWITCHELL AIR GAUGE tells you in one minute if your tires are in danger. Simply hold the gauge to your valve and the indicator informs you what your tire pressure it. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.



Price $1.00 Each May Be Obtained at All Dealers

THE TWITCHELL GAUGE COMPANY

1256 South Michigan Avenue CHICAGO, ILLINOIS

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The car with maximum value in it and superior service behind it

Top Values

Extra liberal wheelbase, unusually commodious tonneaus, and a silent, masterful engine of flexible power, make the KisselKar a capable performer under severest service.. Low, rangy body, with simplified lines, and wide, deep seats, give a distinguished appearance that belongs to the KisselKar almost exclusively.

Superior Service

KisselKar service is supplied through a national organization with service centers, maintained by the manufacturers, at principal points, to give owners the full service that lowers maintenance, and retards depreciation. This partial list of service centers, and especially equipped sales agencies, shows the scope of KisselKar service:

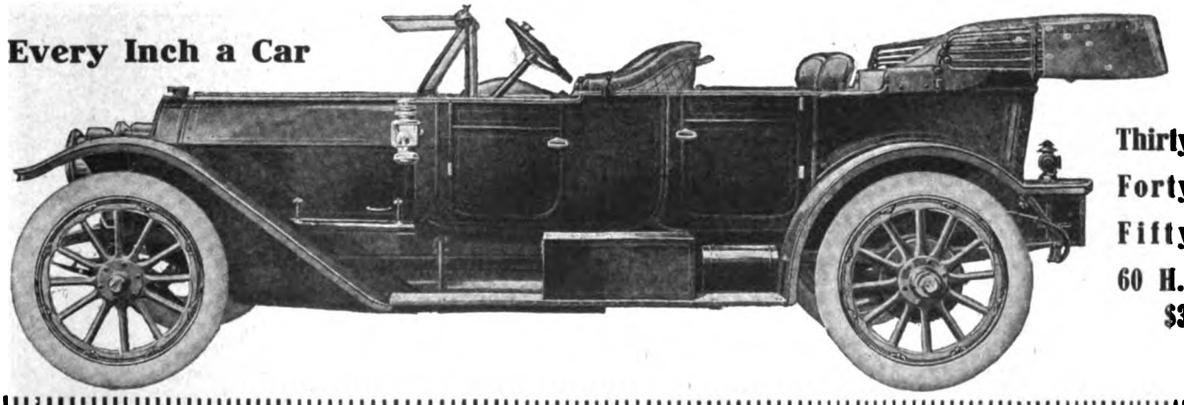
Boston, New York, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Chicago, Milwaukee, Kansas City, Omaha, Butte, Denver, San Francisco, Los Angeles, Seattle, Portland, Minneapolis, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and other principal points throughout the United States.

KISSELKAR

The values of the KisselKar, model for model, are unmatched. The Kissel Motor Car Company's maintenance of service buildings at principal points, is a guarantee of the fullest motoring pleasure. This complete service, and the conspicuously superior values in the KisselKar line, bring together the two most important elements of careful car selection. Write for catalog.

KISSEL MOTOR CAR COMPANY, 159 Kissel Avenue, Hartford, Wis.

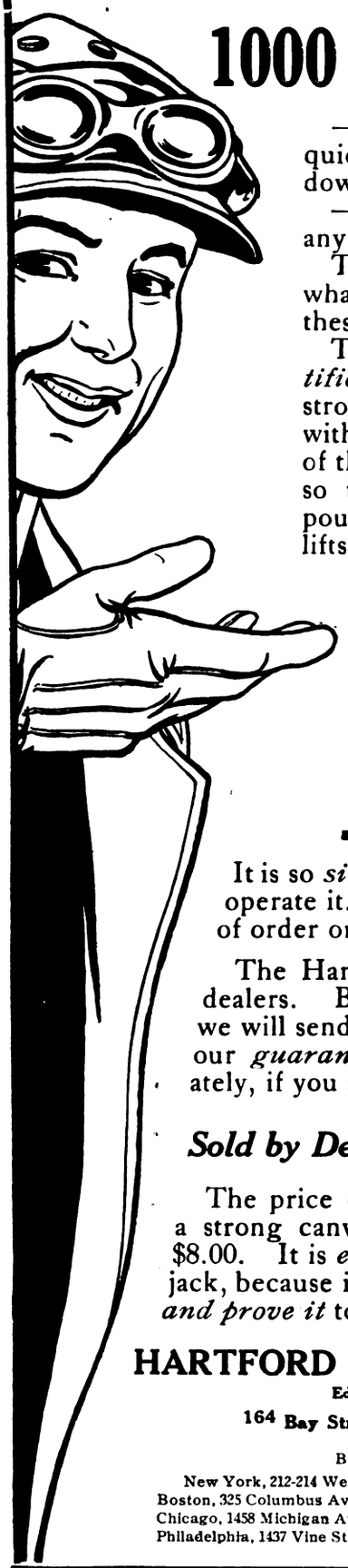
Every Inch a Car



Thirty $1500
Forty $1850
Fifty $2350
60 H. P. Six $3000

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This short stroke, long lever jack lifts 1000 lbs with 15 lbs pressure—easily



—Lifts it unfailingly, smoothly, quickly, without ever a breakdown.

—Lifts it on the road or at home any day throughout a life-time.

The Hartford Auto-Jack does what no ordinary jack *can* do for these reasons:

The Hartford is built on *scientific lines.* By using the short stroke, long lever principle, and with the ingenious arrangement of the gears, energy is multiplied so that when you expend 15 pounds' pressure on the handle it lifts 1000 pounds on the rack.

The Hartford is 100 per cent *efficient.* Whether you lift or lower your car, the Hartford works surely, powerfully, without jerks—as smoothly as a first-class engine.

The Hartford is built of the *finest materials:* the lifting rack is cut from solid steel; the steel gears are machine cut and specially hardened. Working parts all of chrome nickel steel. The hardwood base gives perfect stability. It will last a life-time and outwear several cheap jacks.

Hartford Auto-Jack

It is so *simple* in construction that anyone can operate it. There's nothing that can get out of order or get stuck. The ratchet never slips.

The Hartford Auto-Jack is sold by nearly all dealers. But if your dealer cannot supply you, we will send you one on receipt of price with our *guarantee* to return your money immediately, if you are not satisfied.



Requires only 1/3 the effort

The Rachet Never Slips

Reversing Lever on Front where it is most convenient

Sold by Dealers Everywhere

The price of the Hartford, with a strong canvas containing-bag, is $8.00. It is *economy* to pay a little more for this jack, because it gives superior service. *Get one and prove it* to your own satisfaction.

HARTFORD SUSPENSION COMPANY

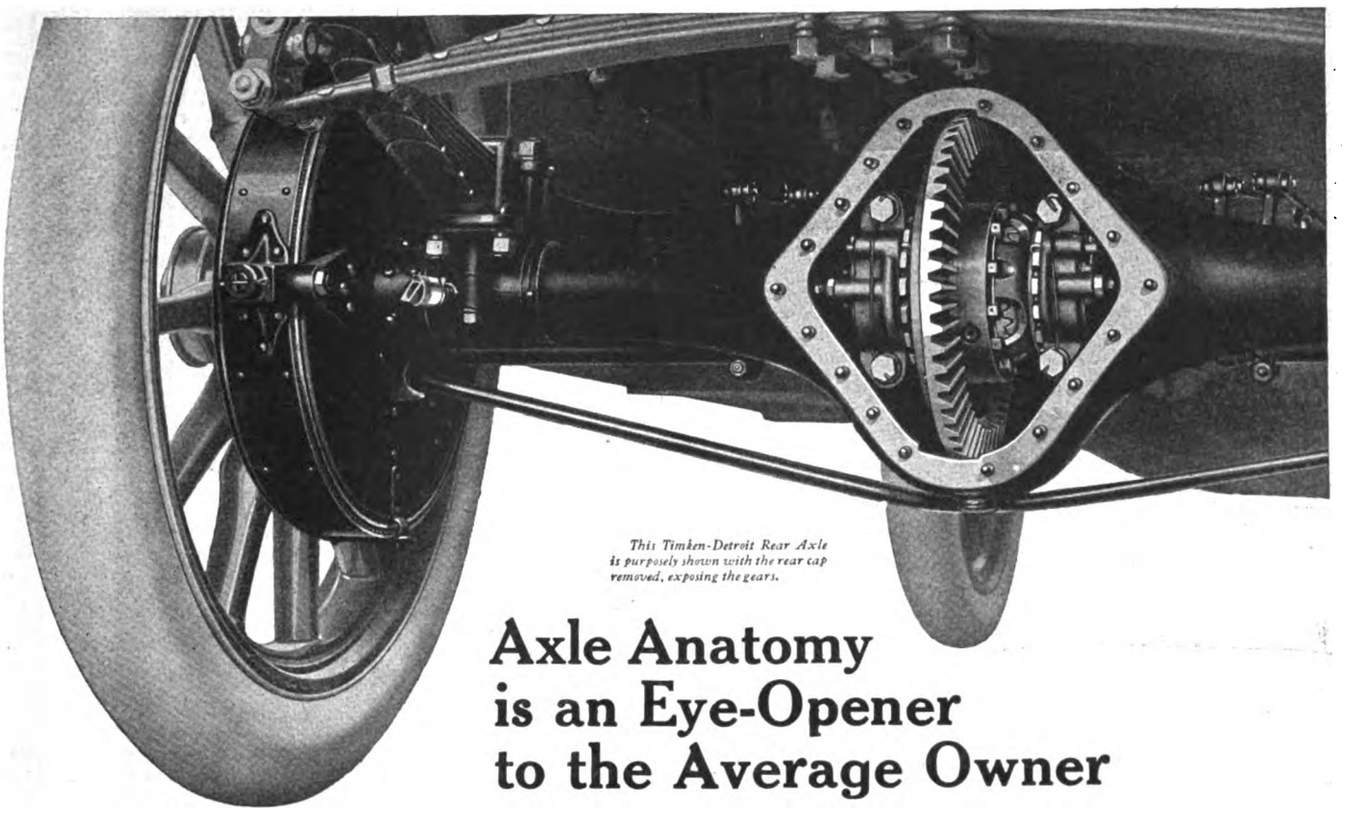
Edward V. Hartford, *President*

164 Bay Street Jersey City, N. J.

BRANCHES:

New York, 212-214 West 88th St. and 1700 Broadway
Boston, 325 Columbus Av. Newark, 289 Halsey St.
Chicago, 1458 Michigan Av. Kansas City, 1524 Grand Av.
Philadelphia, 1437 Vine St. Detroit, 870 Woodward Av.

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This Timken-Detroit Rear Axle is purposely shown with the rear cap removed, exposing the gears.

Axle Anatomy is an Eye-Opener to the Average Owner

To know more about the rear axle will help you to understand one of the biggest problems of good motor-car construction:—

To understand the part of your car that does more different things than any other:—

The part that must be made of hundreds of separate pieces — and yet must be combined by perfect workmanship into a perfect unit.

Look at the Bearings in a Timken-Detroit Axle

You will find they are Timken Tapered Roller Bearings.

No others are used in the Timken-Detroit Axle.

Timken Axles demand the *one* bearing that has the greatest capacity for vertical load, equal capacity for end-thrust, perfect adjustability for wear.

The bearings in your car are so important, they have so many things to do that you should know more about them.



Timken Roller Bearing, with cup removed, showing the ardened and tapered steel rollers, held in position on hardened steel cone by the pressed-steel cage

TIMKEN
AXLES & BEARINGS

Timken has been the pioneer in good axle construction.

First, there's the one-piece, pressed-steel housing, originated by Timken

It has to be strong—a rear axle carries more than half the weight of the car and its load.

It has a big, easily removed rear cap, so that you can reach the gears without trouble.

Then there's the Timken power-transmitting unit — another feature originated by Timken.

All the gears—driving, pinion, and differential gears—are contained in this unit.

The entire unit is easily put in place, easily removed, and is completely assembled and tested before it is installed.

Timken accuracy demands the *grinding* of gears.

Even the finest gear-cutting machines, alone, will not make gears as quiet as *we* know they must be.

So Timken invented a process, designed and built a gear-grinding machine that corrects all the minute inaccuracies left by the cutters.

Gears, shafts, hubs, bearings, brakes—all tell a Timken story.

Every smallest piece—out of hundreds—is watched, tested, inspected, made perfect.



This is the same axle as the one shown at top of the page. The rear cap can be quickly removed by unscrewing the nuts—a great convenience in inspecting and adjusting gears and bearings.

Write for the Timken Primers, No T-7 "On the Care and Character of Bearings," and No T-8 "On the Anatomy of Automobile Axles." They will be sent free at your request, and will give you new knowledge of these most important motor-car parts.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.
THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

For more than fourteen years the Timken Roller Bearing Axle (made at Canton Ohio), has been giving satisfactory service in horse-drawn vehicles

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The Automobile Dealer Who Has the INVINCIBLE Has the "Jump" on His Competitors

The reason is simple—it's the RIGHT starter at the RIGHT price. It doesn't foul the spark plugs. It is perfectly safe—always dependable.

If You Want to Be Shown—Try This:

Install an INVINCIBLE on your demonstration car. Use it ten days. If it doesn't stand the "acid test"—prove up as being the solution of the starter question—ship it back and get your money refunded. We know from experience that when you demonstrate it to your customers, you will find that one "Show-me" demonstration is all they require.

The INVINCIBLE Starter is the Simplest on the Market

The INVINCIBLE hasn't a complication in its construction. All there is to it is shown in the small illustration. Any good mechanic can install the INVINCIBLE in an hour without mutilating the car. It can be used on any four or six-cylinder automobile or marine engine equipped with battery and magneto.

Wear the Smile of Starter Satisfaction

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Get an Invincible $25 STARTER

How the INVINCIBLE Starter Operates

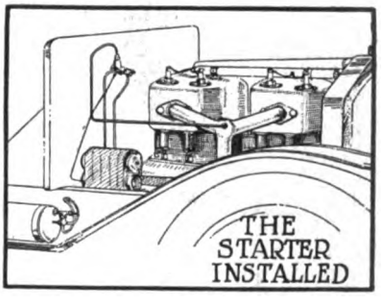
The INVINCIBLE STARTER operates on a proper mixture of acetylene gas and air—a method which meets with the greatest technical and popular approval. By pressing a foot button located in a natural position on the dash a just-right proportion of acetylene gas and air is admitted to the intake manifold, thence to the cylinders. To start the car it is only necessary to go through the ordinary operations for starting on the spark. In stopping, you retard the spark and throttle and the last revolution of the motor draws in a mixture ready for the next operation. Each start costs less than 1-25 of a cent. Not the slightest effort is required. A woman or child can start a 90 H. P. car as safely as an electric brougham.

The Price of the Starter, Complete, is $25.00 Express Prepaid

Used as standard equipment by the United States Motor Co., and other well known manufacturers.

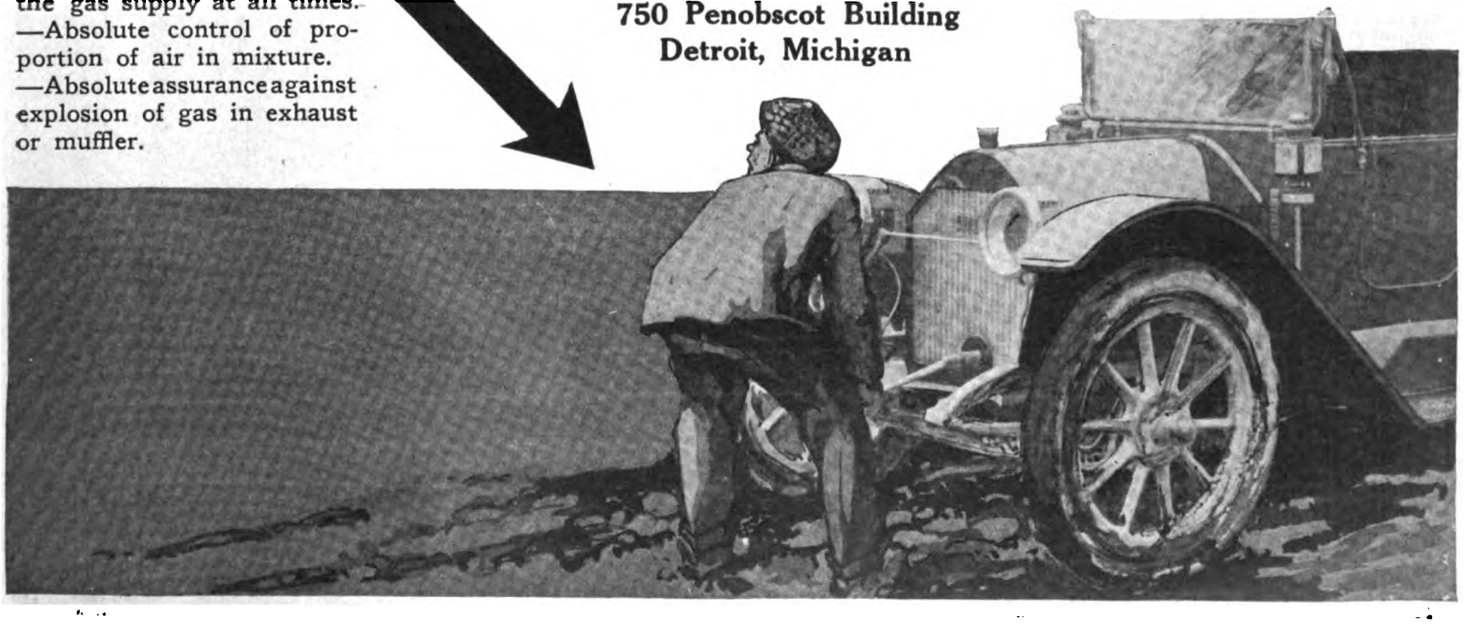
HERE IS THE DEALER'S OPPORTUNITY: Because of their simplicity, INVINCIBLE STARTERS can be made and sold at a lower price than any other high class starter on the market.

No Motorist will pay more than $25.00 for a Starter when for that price he can get a safe, certain, economical INVINCIBLE. That is what makes an INVINCIBLE agency a good thing—a live proposition. Write or wire today to get your territory allotment.

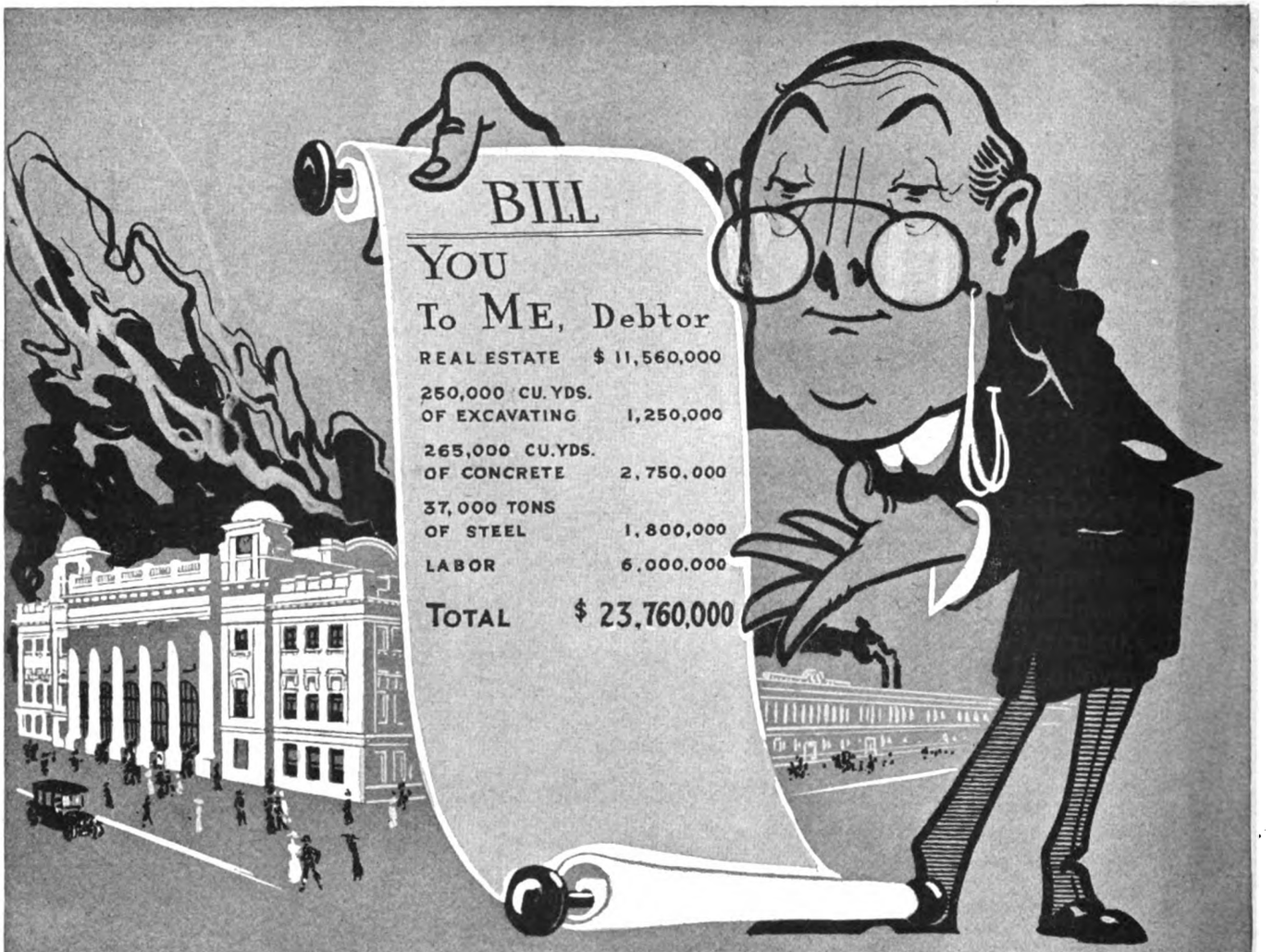


The INVINCIBLE Starter gives you
—Absolute control of the gas supply at all times.
—Absolute control of proportion of air in mixture.
—Absolute assurance against explosion of gas in exhaust or muffler.

Invincible Starter Co.
750 Penobscot Building
Detroit, Michigan



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You Don't Have to Pay It

Your part of the cost of monumental railway terminals is never *felt*—because so very *many* people use the railway. Only roads whose passenger traffic is *tremendous* can *afford* to give you palatial stations. On a smaller volume of business it couldn't be done — without charging you *double* for your railway tickets.

The Stewart volume of business is enormous. Stewart Speedometers are on four cars out of five. The Stewart is the best that can be made, and it's sold at a minimum price. *Other* makers can't supply a comparable instrument at double the price.

The Stewart is a perfect speed and distance measure. A beauty in appearance and a marvel in accuracy.

With Stewart Speedometers on four cars out of five, others *have* to charge more just to keep alive.

Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial—large figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft—drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB."



Speedometers, $15 to $30
Clock Combinations, $45 to $70

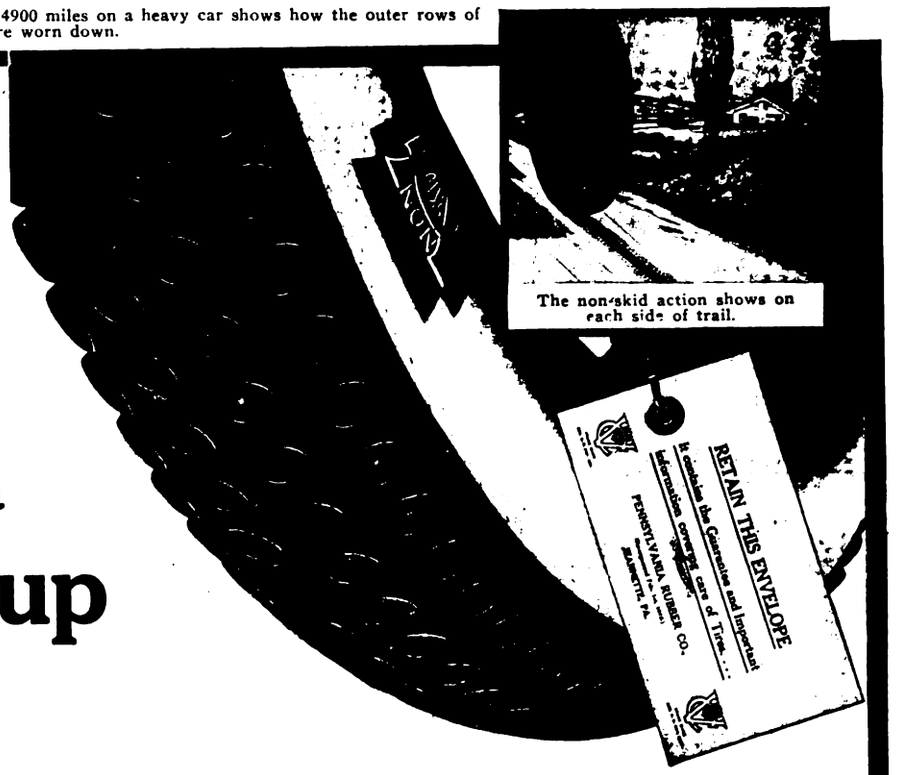
STEWART & CLARK MANUFACTURING COMPANY

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit Minneapolis Chicago Los Angeles Boston Cleveland San Francisco New York London Kansas City Philadelphia Paris Indianapolis

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The inset photograph to the right of a tire that has already done 4900 miles on a heavy car shows how the outer rows of cups preserve the absolute non-skid quality after the center rows are worn down.



What is the best tire deal the dealer can offer his customers this year?

Pennsylvania Vacuum Cup Tires

Three years of unprecedented service success enables us to come out with a definite guarantee of 4,000 **actual** miles service attached to every tire. In addition there's the guarantee that a car equipped with Vacuum Cup Tires **will not skid** on wet or greasy pavements, or full purchase price paid back for them after reasonable trial.

The business-pulling power of such guarantees cannot be ignored by any live dealer in this day of keen competition. It means to the consumer **positively assured satisfaction.**

Since the first general announcement of this guarantee, Pennsylvania Vacuum Cup Tires have been proving quick sellers and head-liners for those dealers handling them.

Our exceptional guarantees are being widely advertised. Be prepared to supply the demand. Write us.

PENNSYLVANIA RUBBER COMPANY

(Re-organized February 1st, 1910)

JEANNETTE, PA.

BRANCHES :

Pittsburgh, 505 Liberty Avenue
Detroit, 254 Jefferson Avenue
Chicago, 1004 Michigan Ave.
Minneapolis, 34 South Eighth St.
Kansas City, Mo., 514 E. 15th St.
Cleveland, Ohio, 1837 Euclid Ave.

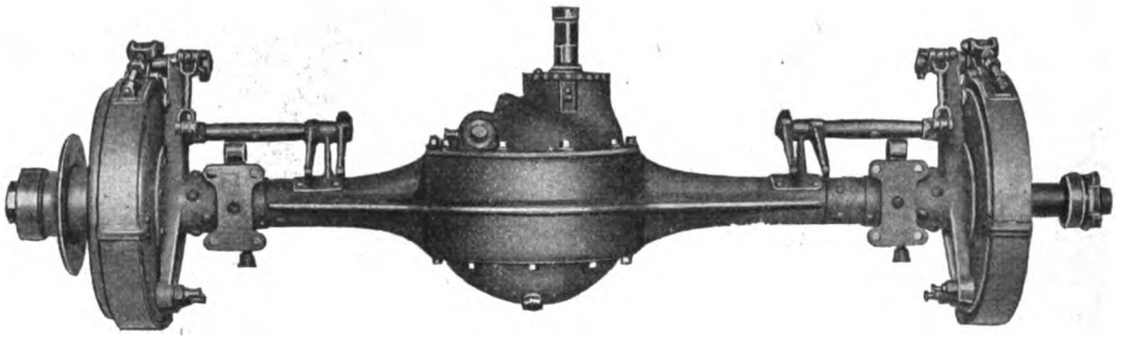
PENNSYLVANIA RUBBER CO OF NEW YORK
New York City, 1700 Broadway

PENNSYLVANIA RUBBER CO. OF CALIFORNIA
San Francisco, 512-514 Mission Street
Los Angeles, 930 South Main St.

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American American

American Axles

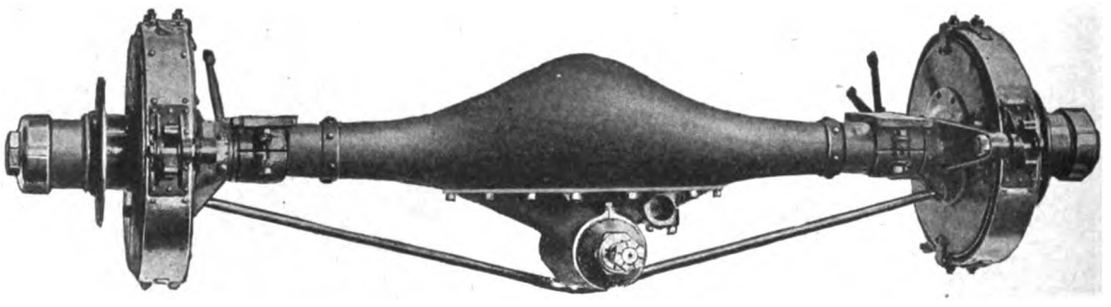


Whether it be a bevel or worm drive rear axle, the *American* should hold first place both in the mind of the manufacturer and the man who contemplates buying a car.

The fact that we built and successfully introduced the first bevel drive type of rear axle in America and now lead in the production of the worm drive type, in itself proves our superiority.

American Axles both bevel and worm drive, can be furnished for cars weighing up to 4500 lbs. and to 60 horsepower.

The worm and bevel in all cases are mounted on annular ball bearings of ample size with proper thrust bearings. Hubs can be equipped with annular or taper roller type bearings, as may be specified.

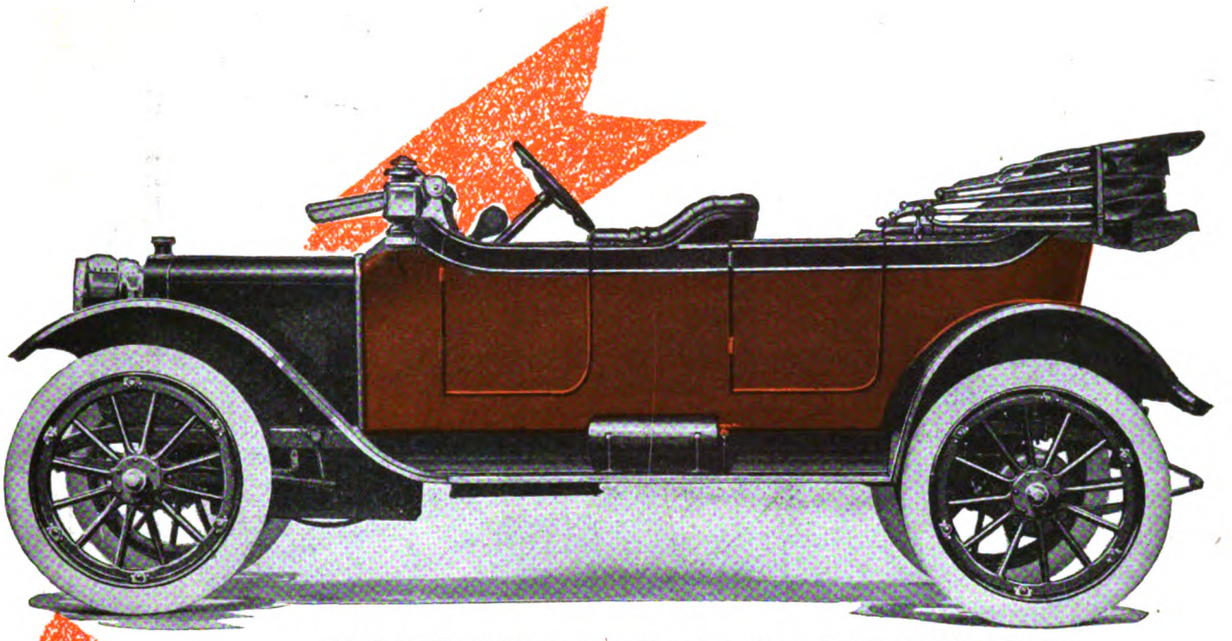


THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

We Want the Best Dealer in 2000 More Towns

WE'RE building 10,000 R-C-H cars this season—we shall build 30,000 for next year. We want additional dealers to handle the increased output. This year demand ran away with production, and our entire output was contracted for, with much of the best sales territory in the country unsupplied.

But we don't want merely men who will agree to sell the R-C-H cars. We don't want the one-season man, the doubtful man, the unstable man. We want dealers who will take up the R-C-H line, because, after thorough investigation, they have convinced themselves that in no other way can they give their customers so much value for the money, and for just that reason the R-C-H is the easiest car to sell.

There is hardly a post-office from the smallest cross-roads hamlet to the largest city, from which we have not received inquiries regarding the R-C-H in response to our extensive advertising. And there is no section where the R-C-H, in the hands of enthusiastic owners, is not living fully up to the advance notices. So we ask that dealers everywhere who appreciate the right car at the right price; who appreciate the utmost degree of factory co-operation; who desire a **permanent** connection; growing better and better as the years go by—write us at once.

To such dealers we have much of interest to say.

GENERAL R-C-H SPECIFICATIONS—**Motor**—4 cylinders, cast en bloc—3¼ inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

YOU CONVINCE US, AND WE'LL CONVINCE YOU.

R-C-H CORPORATION 104 Lycaste Street Detroit, Michigan

BRANCHES:

Atlanta, 548 Peachtree St.
Boston, 563 Boylston St.
Buffalo, 1225 Main St.
Chicago, 2021 Michigan Ave.
Cleveland, 2122 Euclid Ave.
Denver, 1520 Broadway.
Minneapolis, 1206 Hennepin Ave.
New York, 1989 Broadway.
Philadelphia, 330 No. Broad St.
Walkerville, Ontario, Canada.
Detroit, Woodward and Warren Aves.
Kansas City, 3501 Main St.
Los Angeles, 1242 So. Flower St.

TOURING CAR
Model EE
$900 F. O. B. DETROIT

32x3½ tires, demountable and quick detachable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy Curtains, adjusted in an instant, and make the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

Standard Model
$850 F. O. B. DETROIT

Top, "Jiffy" curtains, windshield, generator, 5 lamps, horn, tools, and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

R-C-H

"Twenty-Five"

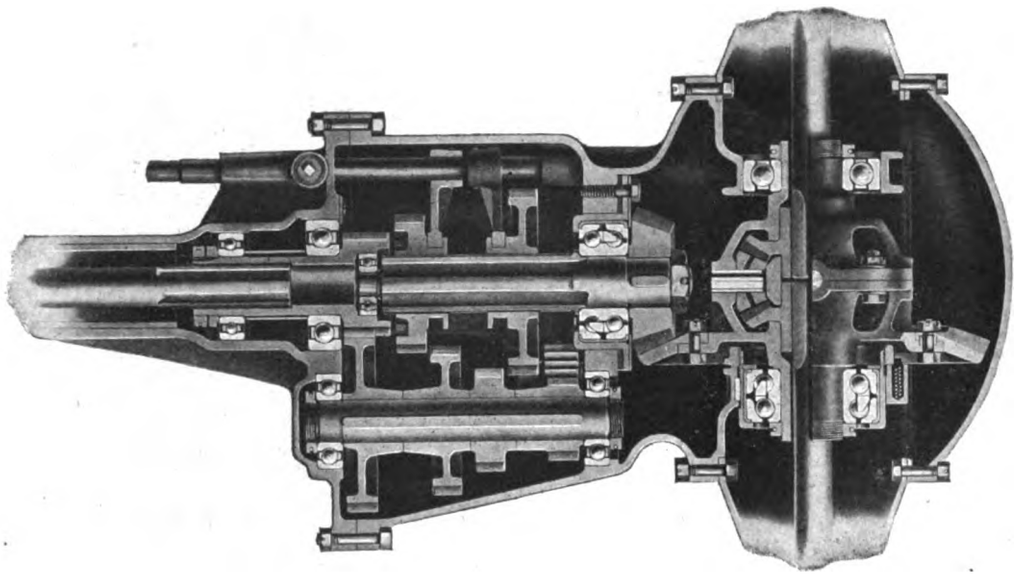
ROADSTER
Model EE
$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

Standard Model
$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

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American Made FOR American Trade

New Departure GUARANTEED Ball Bearings

In Sixty Per Cent. of American Cars

SUPERIOR FOR THE TRANSMISSION: The success of New Departure Double Row ball bearings in resisting excessive radial loads and thrust stresses is demonstrated in the fact that this bearing is more commonly used than any other in the transmission back of the bevel pinion. It does away with the cumbersome thrust washer, complicated and expensive mounting and gives maximum efficiency and durability.

NUMEROUS ADVANTAGES IN THE DIFFERENTIAL: The use of the New Departure Double Row on the side of the differential insures simple, economical, ample provision for carrying the considerable thrust loads from the ring gear, fixes the working relation of the parts and prevents "slapping" of the gears. These are important advantages.

New Departure Single Row Ball Bearings are employed in the construction illustrated above, to care for radial loads only. This bearing has no superior, is absolutely guaranteed for strength of material, quality of workmanship and accuracy of finish.

CATALOG ON REQUEST—HIGHLY SPECIALIZED ENGINERRING INFORMATION ON YOUR BEARING PROBLEMS FOR THE ASKING

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.

Western Branch—1016-17 Ford Building, Detroit, Mich.

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Straight Talk to the Trade

Now-a-days the motor car without a practical demountable rim is out-of-date. And right now, before the motoring season is fully under way, is the time to have your customers equip with

"Firestone"

Quick Detachable

Demountable Rims

Built from the Tiremaker's Standpoint and Experience

The past record of every demountable rim on the market is an open book. You know that not all demountable rims have withstood the test of time and *actual road service.*

You know that other rims have come and gone, while the Firestone rim has steadily gained in leadership and favor among car owners. Advance orders for 1913 show that the leading car makers of the country will all use Firestone rims—

Because:

The Firestone rim has a *continuous* bearing support all around the wheel. It has no wedges placed here and there to force the rim out of round.

The Firestone rim has a "no-split" or unbroken base that makes it water-tight—keeps moisture from working through and decaying the tire.

The design of the Firestone rim does away with all complicated and delicate adjustments, absolutely preventing rusting together of parts, ensuring reliability and ease of operation *at all times*, and requiring no special tools to operate.

The Firestone quick-detachable feature is a *reality*. It enables you to change tires or inner tubes when the rim is *on* the wheel as well as *off*. Think what that means when overtaken by repeated punctures.

Several years of success have refined Firestone rims to the lightest weight consistent with safety and practicability.

Let us help you get the Demountable Rim Business of your locality. Write for our proposition.



A—Note the base of this rim. It is not split either *across* the rim or *around* it. That makes the base water-tight, preventing moisture from working through and decaying the case and tube.

B—The Firestone clamping ring gives the rim a *continuous* bearing support and keeps it from getting out of round as when wedges are inserted at intervals between rim and felloe.

THE FIRESTONE TIRE & RUBBER COMPANY - AKRON, OHIO

"America's Largest Exclusive Tire and Rim Makers"

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Increasing Demand for Tuto Horns

THAT the TUTO Horn is the most popular and satisfactory horn that was ever manufactured is shown by the tremendously large sales during the year the TUTO has been on the market.

¶ Many thousands of automobile owners have purchased TUTO horns through dealers to replace the inadequate bulb horn that was furnished with their car

¶ Throughout the country the TUTO horn has reigned supreme because it is unlike any other electric horn that was ever manufactured. Therefore it has no competitors.

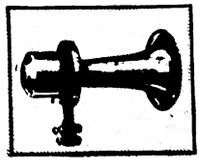
¶ Car owners generally admit that the TUTO, with its exclusive patented two-tone feature, is the logical electrical horn. In fact, the TUTO is the only electric warning signal made that fully meets present traffic conditions.

¶ The two-tones, a loud note for emergencies and a low note for service purposes, meet every requirement of the automobile owner and chauffeur and fully answers the purposes of the inadequate bulb horn and loud one note electric horn.

¶ The push button control which makes it possible to sound either note without removing the hands from the steering wheel appeals strongly to the car owner. It overcomes one of the principal objections to other electric horns.

¶ These features, together with the liberal try-before-you-buy sales proposition, have combined to make the TUTO horn the best selling and most popular electric horn that was ever manufactured.

¶ Many manufacturers have met the constantly increasing demand for TUTO horns by including the TUTO in standard equipment. Many more are coming into the TUTO fold. If you are still outside we would like to hear from you.



TUTO-Horn, $25.00

The Dean Electric Co.

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

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To Automobile Dealers Who Think

What are Your Plans for this Year?

The advancement of an industry is shown by the wrecks of the companies who participate in its progress.

This is true with all industries. Failures occur during the most prosperous times, just as they do during periods of panic.

What Failures Show

In 1910, 446 clothing manufacturers, for instance, failed. This in prosperous times. The liabilities totaled $4,826,047.

Yet the big manufacturers grew. They were not affected. They felt no money stringency. They did not even feel the effect of severe competition. Their progress was made at the expense of the less competent—less successful makers.

That holds true with the automobile industry. Some manufacturers will continue to grow bigger. Theirs will be big lines. Companies manned by men of inexperience and insufficient capital will be unable to survive.

Even when the demand was great, there were many failures. But as competition becomes harder, as those successful makers develop their business and are able to eliminate wasted effort, it will be harder for the less competent. It is the same with men as with industries.

We are now closing agency arrangements for 1913. Our entire 1912 product was in excess of 2,500 cars oversold and yet dealers were well cared for. Demand exceeded our estimates by that number. Just as we constantly scan the industry for the most efficient men—whether they be testers, machinists, superintendents or managers — we are as watchful for dealers who can make good.

Be Identified With a Success

This advertisement is merely to suggest that you note what the HUDSON has done each year of its career.

There has not been a single momentary stop or failure. Perhaps you, too, would like to be identified with its organization. At any rate, close observance of its progress indicates pretty thoroughly the advancement the industry is making.

Dealers Get Real Help Here

If you would like to know something of the unusual way in which the combined ability of this organization is made to aid its dealers, and think you live in a territory in which we need just such live, energetic and thorough representation as a thinking dealer such as yourself can give, please write at once.

1913 contracts are being made. Our plans are the most attractive we have ever had. They include a "Four" and a "Six," which you will admit, when you have seen them, have no superior in quality, comfort and richness, in any car of their respective classes, regardless of price. No man is too capable for us—none too aggressive. We want the best and are willing to make the proposition the best any one can demand.

The Money Making Line is neither the right car nor the right price nor the right merchandising. It is all of these combined in the right proportion.

HUDSON MOTOR CAR CO.

7348 Jefferson Avenue, Detroit, Michigan

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Nobby Tread Wins

The suit which has been pending against The Famous Nobby Tread Tire has been won, and won without recourse on the part of the complainant by the United States Tire Company. The greatest non-skid tire ever produced thus continues to be the exclusive property of America's predominant tire concern.

Nobby Treads Will Stop Your Skidding

SOLD EVERYWHERE

UNITED STATES TIRE COMPANY
New York

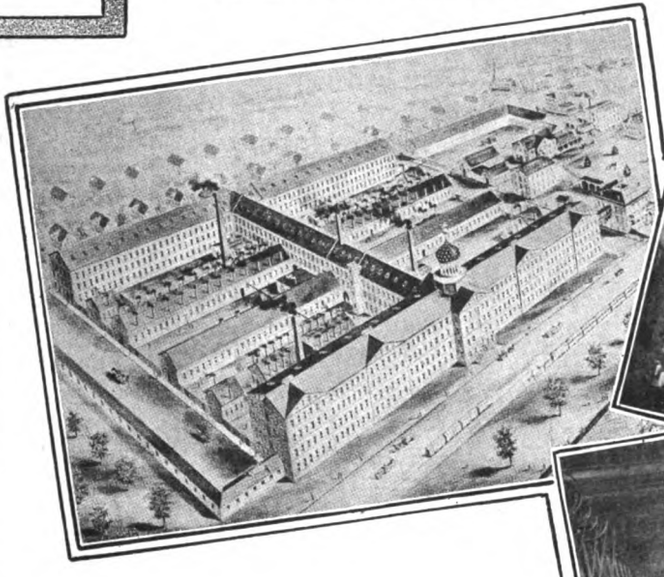
Dealers will please post this important announcement in their windows.

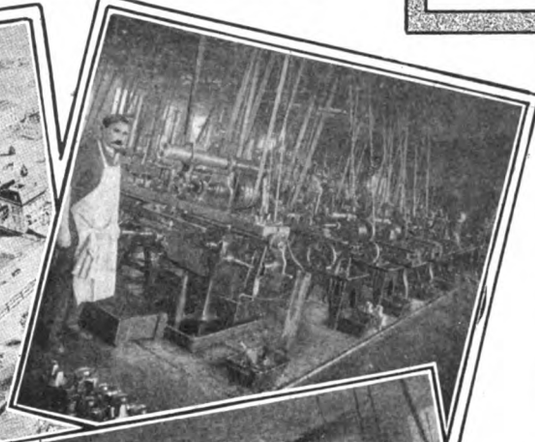
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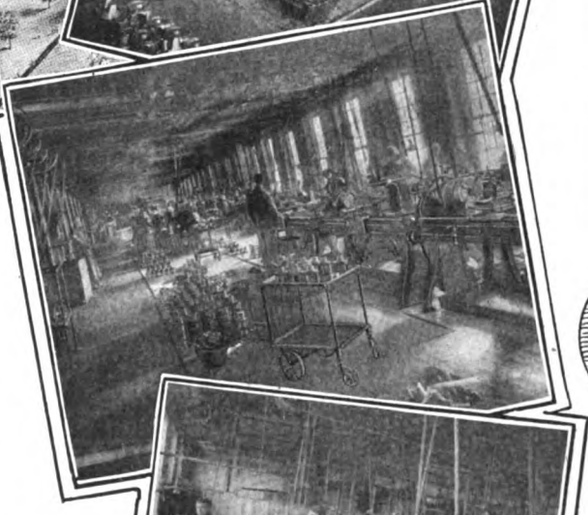


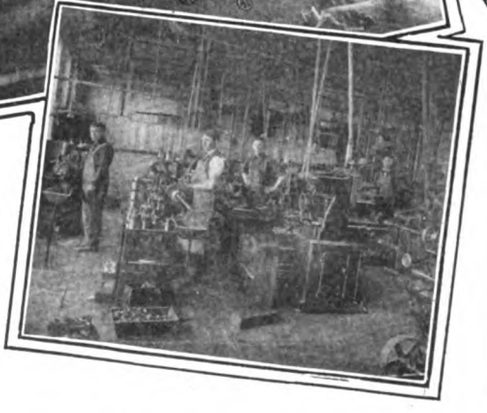












HPA Co

HPA Co

The plant shown here is, without exception, the largest one in America devoted to the manufacture of clutches and universal joints—a statement that on the face of it may mean much or little.

A big establishment fitted with out-of-date machinery would have small prestige or patronage in these days of precise manufacturing methods.

And so when we tell you that the Hartford Auto Parts plant is the **best equipped** as well as the largest of its kind—

Then it is plain that we have the **one** combination that spells service of the highest type—service to the trade and through it to the car owner public.

We are cone clutch and universal joint specialists. We make only these two important parts of the power plant, and make them as well as the highest grade materials, machinery and brains coupled with superior facilities will allow.

This, Mr. Manufacturer, guarantees you, first of all, the best. **Hartford products embody Hartford quality**—a quality which will be explained in detail in succeeding issues of this paper.

We are going to show the manufacturer of completed cars just how and why Hartford clutches and universal joints are essential in the making of a car that will stand up under all conditions of usage.

We want to figure on the specifications of every engineer who is in the market for these parts.

J. S. BRETZ CO., New York, Detroit, Sole Selling Agents.

CONE CLUTCHES

HARTFORD AUTO PARTS CO.
HARTFORD, CONN.

UNIVERSAL JOINTS

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Overland

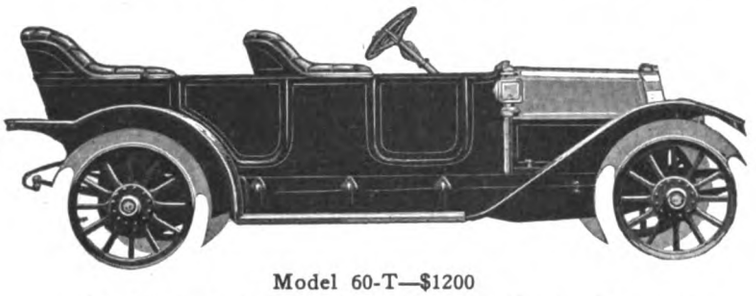
VALUE equal to that in our Model 60 at $1200 is what you are bound to ask for in popular priced cars. United States government standard weights and measures indicate how much you have a right to demand of the seller at his price—and we have made our Model 60 the standard automobile "measure."

Consider what this means! You are assured of the very most for your purchase money. The Overland Model 60 is the car by which other cars of this type are ranked.

We challenge you to go to any salesroom and find a car at $1500 with any more practical value than you get in our Model 60.

Write us today for a catalog of proof. Ask for book I-45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horse-power, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, May 16, 1912. No. 8

GOODRICH BUYS DIAMOND

Bitter Rivals of the Tire Trade to Become One Company—Purchase is Outright but Terms Not Public—Wild Rumors That Arose.

Out of a great mass of rumors, allegations, assertions, statements and figures which have appeared in print concerning a reported merger of the B. F. Goodrich Co. and the Diamond Rubber Co., of Akron, O., not one word of which has borne the stamp of authority, it is possible for the Motor World to state, and with full authority, that the substance of the great conflict of rumors is that the B. F. Goodrich Co. has purchased outright the Diamond Rubber Co.

It is in no sense a merger, in the generally accepted sense of that word. The Goodrich company will simply take over the Diamond company, lock, stock and barrel. The terms and conditions of the sale have not yet been made public but will appear later when they are submitted for the ratification of the stockholders of the respective companies. That the Diamond interests will profit handsomely, however, is well known.

On April 1st last, the Goodrich company itself became a New York corporation with $45,000,000 in capital stock, preceding which action a luscious "melon" was carved and distributed to its stockholders, and the most reliable information makes it appear that this capital now will be increased to $90,000,000, of which $60,000,000 will be common.

The purchase of the Diamond interests by the Goodrich company puts an end to a succession of rumors which periodically have cropped up for two years or more. During that period that overtures were made by one side or the other is not denied, but apparently they never were seriously entertained. Only two months since they were revived in Chicago, at which time Howard E. Raymond, second vice-president of the Goodrich company, put an end to them by one of those vigorous and sweeping denials of which he is capable; and, strange though it may appear in the light of today, the denial was wholly true. Raymond, who is a man of his word, states positively that at that time no acquisition of the Diamond Rubber Co., or any merger with it, was contemplated or even thought of; which makes plain that when the Goodrich interests finally decided to take over the Diamond company no time was lost in prosecuting the transaction.

Among the many wild and woolly rumors to which the matter gave rise, were those which stated that either or both the Fisk Rubber Co., of Chicopee Falls, Mass., and the Goodyear Tire & Rubber Co., of Akron, O., were in some way involved in the Goodrich-Diamond deal; but on the authority of President Dunn and Vice-president Seiberling, of the respective companies, the Motor World is able to state that there is absolutely no foundation whatsoever for such reports.

By coupling the then pending Goodrich-Diamond transaction with the intention of the United States Rubber Co. to greatly increase its already enormous capital, one newspaper guesser, wilder than all the others, was enabled to see the latter company drawing the Goodrich and Diamond companies into its already extensive domain.

The one statement that is absolutely beyond doubt is, as already has been stated, that the B. F. Goodrich Co. has purchased outright the Diamond Rubber Co. This statement comes directly from the Goodrich inner circle and it may be accepted as authentic without reserve.

Locomobile to Float a Bond Issue.

For the purpose of increasing its capital stock, and authorizing an issue of debenture and first mortgage bonds, a special meeting of the stockholders of the Locomobile Co. of America has been called to occur in Bridgeport, Conn., on May 23rd. It is the intention to offer a portion of the common stock as a bonus to purchasers of bonds.

FLANDERS IN THE METZGER DEAL

But Not All the Way In, as Fear of the Law Makes Him Cautious—Unusual Angles of an Unusual and Much-Mixed Situation.

Appearances were not deceitful so far as they applied to Paul Smith's action in relinquishing the sales management of the Studebaker Corporation to become sales manager and first vice-president of the Metzger Motor Car Co., of Detroit. Smith is a personal protege of Walter E. Flanders, general manager of the Studebaker automobile division, and the surmise that Flanders was either in front of or behind Smith in the Metzger affair proves to be the case. It is equally certain that other members of Flander's personal staff in the Studebaker establishment will follow Smith into the Metzger company. In fact, one of them, Fred Wade, already has gone. He was Studebaker's purchasing agent and he now fills a similar post in the Metzger company. It is expected that E. LeRoy Pelletier, the Studebaker advertising man, shortly will go and do likewise. Pelletier, like Smith, is one of Flanders's shadows, if not his megaphone.

Flanders himself has not left the Studebaker Corporation. That he is willing and anxious to leave admits of no doubt, but there is a tie which binds him to his post. It is in the form of a contract and did it not exist the situation in the Metzger deal would clear rapidly.

As the Motor World stated at the time, Flanders tendered his resignation to the Studebakers some three months ago. It was not accepted then, and it is not likely to be accepted now. Fear of legal complications serve to make Flanders himself somewhat cautious in his remarks. He has been quoted at more or less length, but he is farseeing enough not to commit himself to very definite statements. When approached by a Motor World man on Tuesday last, he admitted, through Paul Smith,

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that he had several proposals under consideration and that the Metzger deal was one of them, and one which it was not unlikely he might take up. He also admitted, what W. E. Metzger himself already had admitted, that they were engaged in negotiations to that end. From another source close to Flanders, it was learned that negotiations were the result of the initiative of B. F. Everitt, president of the Metzger company, who with Metzger and Flanders constituted the original E-M-F company.

While it is freely stated that Carl G. Fisher, of Indianapolis, is one of those who will be interested in the $3,000,000 Metzger company which will evolve when things are sifted down, it is known also that Dr. J. B. Book and the Uhleins, the Milwaukee brewers, who are heavily interested in the Flanders Mfg. Co., of Pontiac, Mich., and other Flanders enterprises, will also provide much of the Metzger company's new capital.

The Studebaker interests also own about $200,000 worth of the Flanders company's stock and it is understood that, among other things, Flanders, in addition to seeking his release, also is endeavoring to acquire these shares.

The source of this information—than whom none knows better Flander's thoughts and intentions—also stated that if the Metzger deal is consummated the Flanders factory in Pontiac quite likely will be devoted to the production of either a large four-cylinder car or a "six."

There are those who intimate that one of the cars will bear the name Flanders, although, according to the terms of his contract with Studebaker, it is understood that he has bound himself not to engage in the production of gasolene cars for a term of years. Further complicating the situation, as the Motor World stated some four weeks ago, the name Flanders, as applied to automobiles, has been trademarked by the Studebaker corporation and, although it is a matter of public record, even certain of Flanders's associates are questioning the fact and intimate that a way will be found of using the name of Flanders in some form.

Flanders's contract appears to be the sticking point and fear of litigation which may be far reaching, and which may seriously impair and imperil his interests, are responsible for Flanders's caution and his inclination and desire to speak only through third persons. That he has his work cut out for him in escaping from its terms is fairly clear.

When a man high up in the Studebaker councils was asked point blank whether Flanders had quit, he replied. "No. Mr. Flanders is still with us and," he added, quickly, "I don't think he will leave us."

Colby Plant To Be Enlarged.

Work was commenced last week on an enlargement of the Colby Motor Co.'s plant at Mason City, Ia. The new building will be 100 x 400 feet.

NEW YORKER FATHERS NAYASSET

Two Million Dollar Corporation to Take Over Two Massachusetts Plants—Italian Truck Also Involved.

Nayasett Motor Co. is to be the title of the new company which is in process of formation for the purpose of taking over the interests and business of the Springfield Metal Body Co. and the Brightwood Mfg. Co., both of Springfield, Mass., which were merged last week by the purchase of the Springfield company by the Brightwood company, and the S. P. A. Import Co., of New York.

The actual incorporation of the new company, which will be capitalized at $2,000,000, it is said, by Jason Waters, who is connected with the banking firm of Strong, Sturgis & Co. and who was the moving spirit in effecting the merger, will be completed about June 1st. Of the capital, half will be preferred stock and the other half common. The Smith brothers, who made the Springfield company what it is, will be identified with the new corporation.

According to the present plans, a pleasure car similar to the Orson, which has been built in the Brightwood plant, will be one of the products of the new company. Extensive production is planned and the car is to be sold at a considerably lower price than that which has been asked for the "bankers' car." Not a little of the capital will be devoted to a material enlargement of the business of the Springfield Metal Body Co. and the production of bodies for the trade on an even larger scale than heretofore will be carried on. In addition, the new company will produce the bodies for its own cars and also for the S. P. A. trucks. For the present the trucks will be imported as heretofore though the plans include their ultimate production on American soil.

Verdict for Haynes in Unusual Suit.

Involving the rather unusual situation in which agency contracts for the same territory had been executed by two different men, the suit of Benjamin Goodman, of Chicago, who formerly resided in Omaha, Neb., against the Haynes Automobile Co., of Kokomo, Ind., was practically taken from the jury's hands by Judge Anderson in the federal court in Indianapolis, last week. After hearing the evidence, the court instructed the jury to find for the defendant. Goodman, it appeared, had been an applicant for the Haynes agency for Omaha, and a contract between him and the officers of the company was signed one afternoon at two o'clock, the contract calling for the purchase of at least $50,000 worth of cars and Goodman paying a deposit of $1,200. On the same day, but early in the forenoon, a Haynes factory representative in Omaha had "signed up" another man for the same territory. When advised of the fact, the Haynes company notified Goodman that its contract with him was canceled and returned the amount of his deposit. Goodman accepted and cashed the Haynes check, and that fact appeared to have a strong bearing in deciding the case against him. He alleged breach of contract and asked for $50,000 damages.

Benson Leaves Cadillac for Studebaker.

To fill the vacancy caused by the resignation of Paul Smith, Ernest R. Benson has been appointed sales manager of the Studemaker Corporation's automobile division, with headquarters in Detroit, of course. For the past five years Benson has been sales manager for the Cadillac Motor Car Co., and in a quiet but aggressive fashion, unaccompanied by fireworks, he has played a man's part in building up the Cadillac company's business to enormous proportions. Before entering the automobile trade, Benson was successively identified with the Pope Mfg. Co. for twelve years, A. G. Spalding & Bros. for four years, and with the Hartford Rubber Works Co. also for a considerable period. Benson's former place in the Cadillac company has been filled by the promotion of E. C. Howard, who held the post of assistant sales manager.

To Approve Goodyear's Capital Increase.

To pass on the proposed increase of its capital stock from $6,000,000 to $15,000,000, a special meeting of the stockholders of the Goodyear Tire & Rubber Co. has been called to occur in Akron, O., on May 28th. Of the new stock, 100,000 shares will be common and 50,000 preferred, the latter to be non-participating, cumulative, 7 per cent. shares, but to have no voting power so long as the company is not in default of payment of regular dividends thereon. It is to be redeemable at $120 per share on and after January 1, 1915, the company agreeing not to place any mortgage on its plant without the consent of three-fourths in amount of the preferred stockholders.

Cole to Add a Moderate-Priced Junior.

Adding interest to the situation caused by the formation of the Henderson Motor Car Co., of Indianapolis, by a number of those who were and are identified with the Cole interests, it has become known that the Cole Motor Car Co. itself will market a model which will list at about $1200, and which will be styled the "Cole Junior." At the time, it was stated that the chief reason for the formation of the new Henderson company was a desire to produce a car of lower price than was included in the Cole line, and a Henderson to list at about $1,295 was announced only last week. In order to provide for the "Junior," the Cole company is making ready to erect a $100,000 addition to its already large plant in Indianapolis.

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MERGER EMBARRASSES DENNISTON

"Inner Workings" Force Buffalo Truck Maker Into Bankruptcy—Likely That Creditors Will Realize 100 Per Cent.

Indirectly as a result of the merger which gave rise to the million dollar Buffalo Electric Vehicle Co., the Denniston Co., of Buffalo, N. Y., filed a voluntary petition in bankruptcy in the United States District Court there on Monday last, 13th inst. Its liabilities amount to $65,745.94, and its assets to $99,636.27. The court appointed Edward J. Barcale receiver for the company, with authority to continue the business for thirty days.

E. E. Denniston is the president of the company, which manufactured trucks and bodies, and most of the twenty-two creditors are Buffalo corporations and individuals, the largest one being the Marine National Bank, whose claim aggregates $30,000. Another large creditor is Walter H. Schoellkopf, whose claim of $4,500 for money loaned is secured by three trucks which were turned over to him by the Denniston company at the time the loan was made. The Marine bank notes are unsecured. It is stated, however, that all creditors, whether secured or unsecured, will be paid in full. The owners of the building at 1219 Main street, most of which was occupied by the Denniston Co., have a claim for rent amounting to $3,833.35. Bills payable amount to $35,068.22.

The assets consist chiefly of stock in trade, machinery, tools, unfinished work and accounts receivable. The stock on hand amounts to $55,074.59, unfinished work, $10,014.84, and machinery and tools, $21,652.

Internal troubles are said to have precipitated the Denniston plight. Some of its stockholders are also stockholders of the Buffalo Electric Vehicle Co., which it is stated sought to acquire the Denniston factory for the purpose of making its bodies. Some of the other stockholders of the Denniston Co. sold stock to the merger and, according to an inside story, endeavored to force Denniston's hand and compel him to put his property into the pool. He refused to be forced, however, but the situation crippled his resources and defeated his efforts to effect a reorganization.

New Polack Company Absorbs Old One.

The Polack Tyre & Rubber Co., incorporated about a year ago under the laws of Maine with $500,000 capital, has been absorbed and succeeded by a New York corporation of the same name, capitalized at $700,000. The officers of the new company, which just has been formed, are: President, Max Polack, who is now managing director of the parent company in Waltershausen, Germany; treasurer, Adelbert Hauschild, who was vice-president of the Maine corporation; secretary, Milton Dammann. Hugh Helstaedter, manager of the Polack Tyre Co. of London, is also one of the directors of the new American company.

The Pennsylvania Rubber Co., of Jeannette, Pa., which has made the Polack truck tyre in this country, will continue that service for the new corporation.

Trouble Over a Top Leads to Court.

Because the White Co., makers of the car of that name, did not consider a top, furnished by the Manhattan Top & Body Co., up to sample, and because the White Co.'s customer refused to accept it, the White Co. refused to pay for it, and is being sued in New York City Court by the top company. The amount asked is in the neighborhood of $350. The action was technically dismissed this week when the attorneys for the top company were not on hand when the case was called, but there is a likelihood of the matter being again placed on the calendar. The defendant's claim is that the top rattled so badly that the customer refused to accept it, that the top company declined to adjust the mater and that the White Co. was obliged to secure a top from another top maker.

New Men Enter the Frontier Tire.

The reorganization of the Frontier Tire & Rubber Co., of Buffalo, N. Y., was effected last week, when Orson E. Yaeger assumed the presidency and these other officers were elected: Frank V. E. Bardol, first vice-president; John W. Gibbs, second vice-president; George T. Roberts, treasurer; M. F. Dirnberger, secretary; John N. Gardner, general manager. The new head of the Frontier company is also the president of the Victor Motor Truck Co. and the Buffalo Chamber of Commerce. Much additional machinery has been added to the company's plant and executive offices have been opened at 1054 Main street, Buffalo.

Klaxon Charges Miller With Infringing.

Charles E. Miller, of New York, who probably is the best known supply man in the country, has been made the defendant in a suit for infringement of the Klaxon patents, instituted in the United States District Court in New York City, by the Lovell-McConnell Mfg. Co., of Newark, N. J. Miller's alleged infringement consists of having sold Newtone horns, but there also enters into the case a charge that tags were shifted on certain Klaxon horns at one time in Miller's possession.

Selden to Engage in Truck Manufacture.

The Selden Motor Vehicle Co., of Rochester, N. Y., is almost ready to enter the truck market. Its vehicle, which is of one-ton capacity and which employs a four-cylinder, water-cooled engine, has been on the road some time and has given such satisfaction that its manufacture is about to be undertaken in earnest. Among other things, the truck is characterized by a frame and chassis that bring the floor of the platform much closer to the ground.

STAGGARD TREAD NOT PATENTABLE

Court of Appeals Reverses Lower Court in "Nobby Tread" Case—Mell's Invention Declared Mere Mechanical Skill.

Disagreeing wholly with Judge Hazel, of the United States Circuit Court for the Southern District of New York, who late in December last held that the "Nobby" tread tire, made by Morgan & Wright, of Detroit, was an infringement of the Tod J. Mell patent No. 898,907, under which the Republic Rubber Co., of Youngstown, O., produced its "Staggard" tread, Judge Noyes, writing the opinion of the United States Circuit Court of Appeals for the second circuit, on Monday last, reversed the decision of the lower court and declared the patent invalid.

When he sustained the patent, Judge Hazel swept out the Healy patent, which long since expired, and dismissed all other alleged anticipations which were brought to bear by Morgan & Wright, holding that "the gripping capacity of the stud" which was the desideratum of Mell's invention was absent from the Healy tread and all the others.

On the other hand, the Court of Appeals in its opinion declares that the testimony showed that Mell actually started out with the Healy structure and that it was the changes which he made in it that enamled him to obtain his patent.

"The case is rather remarkable," says the court, "in that we can see the patentee making changes in the nearest structure of the prior art and can determine better than ordinarily whether such changes involve the exercise of inventive faculties or mere mechanical skill."

Having viewed this situation, the Court decided that the so-called Staggard tread came into existence through the exercise of mere mechanical skill and not of inventive faculties, and therefore declared the patent invalid, thus throwing that form of tread open to all.

The decision of the Court of Appeals in full is as follows:

"The patent in suit is for an improvement in resilient vehicle tires and consists, speaking broadly, in an arrangement of protecting studs around the tread surface of the tire, having for its primary object the obtaining of superior road gripping qualities and the preventing of the vehicle from side-slipping or "skidding."

"The first claim of the patent—which was sustained by the lower court—reads as follows:

"'A tire for vehicle wheels, provided with outwardly projecting circumferentially arranged elongated studs each having inwardly diverging walls, a flat outer surface, and a relatively large base, substantially as described.'

(Continued on Page 48.)

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WHO HAS THE HAVERS IN NEW YORK?

Pretty Question Arises When Former Friends Fall Out—Court is Asked to Settle Remarkable Situation.

Just who is agent for Havers cars in New York city and vicinity has developed into an interesting and much involved question within the past few days. At present there are two—at least according to the signs they display and the claims they make. One is the Havers-Imperial Auto Sales Co., of 1662 Broadway; the other is the Knickerbocker Motor Car Sales Co., of 1634 Broadway. The whole difficulty seems to center about William M. Botto, against whom the Havers-Imperial company has brought an action in the Supreme Court for New York county on which Edward F. Rush and the Havers Motor Car Co., of Port Huron, Mich., the latter being the company which builds the cars, are joined as defendants. The plaintiff is making a fight to have itself undisputedly established as the Havers agent and claims it has been grievously gronged by Botto. Meantime, the latter, arrayed in a brown suit and one of the first straw hats of the season, smiles and sells cars at 1634 Broadway and when asked about his status, he and other members of the Knickerbocker concern reiterate "Nothing to say! Nothing to say!"

Until several weeks ago Botto was connected with the Abbott and Regal agency in New York city. Then, at least so the plaintiff states, he arranged to get a contract for Havers cars which contract for various considerations and under various conditions was to be turned over as a sort of asset of the Havers-Imperial concern, which was formed for the purpose of selling Havers cars. This company claims that its president, Fred C. Robie, did secure a bona fide contract after considerable maneuvering and began business as the Havers dealer with a big cloth sign in front of its place of business. But Alfred L. Kull, another member of the Havers-Imperial company, swears that when the contract arrived from the Havers company, Botto unscrewed the company's private mail box from the wall, extracted the contract and went post haste to Port Huron, with the result that when he returned, the Havers-Imperial people were informed their contract had been cancelled. Then arose the Knickerbocker company, of which Botto is said to be manager.

Kull also says a number of things about one Edward F. Rush who, he makes affidavit, is connected with the new "bunch," but formerly was merely an actor and is "a mere dummy for the said defendant Botto." Moreover, Kull claims that one William Robertson, in the employ of Botto and Rush, "on May 1 signed plaintiff's name by endorsement and otherwise on a bill of lading" and secured from the New York Central freight house three Havers cars which were assigned to the Havers-Imperial company.

The complainants ask an injunction restraining the rival organization from doing the Havers business or interfering with the plaintiff's business and desire that the Havers Motor Car Co. be required to specifically perform the contract which is claimed to have been granted the first Havers concern. The order to show cause is returnable late this week.

Agner Acquires Capital and Factory.

Raymond C. Agner, who has manufactured a grease gun and spark plug wrench on a limited scale, finally has secured the necessary capital which he sought, and the Raymond C. Agner Co. now is in being in Burlington, Wis. It has been incorporated with capital stock of $30,000 and these officers: President, Edward Brook; secretary, Hugh Agner; treasurer, George Weiler; general manager Raymond C. Agner. Operations will be carried on in a former school building which has been remodeled to meet the Agner purposes.

Crary Engine Starter Formally Fathered.

The T. C. F. Mfg. Co., which recently was promoted in Detroit to manufacture the Crary engine starter, has completed its organization by the election of the following officers: President, Fred Postal; Vice-president and general manager, R. E. Fair; secretary-treasurer, Harry Postal. Its offices are located at 650 Woodward avenue, Detroit. The Crary starter, which is of the acetylene gas type, already has been adopted as the standard equipment for Lion cars.

Bergdoll Acquires New Jersey Property.

The L. J. Bergdoll Motor Co., of Philadelphia, maker of the Bergdoll car, has purchased a 15-acre plot in Trenton Junction, N. J., on which there already stands a brick factory building, 50 x 100 feet, which never was occupied by those for whom it was erected. Possession will be taken at once, but not all the Bergdoll business will be removed from Philadelphia at this time.

Halladay Restarts Business in Streator.

L. P. Halladay, who once had to do with the manufacture of the car of that name in Streator, Ill., but who for several years has been located in Chicago, has returned to Streator and re-engaged in business there. Instead of cars, however, he will manufacture automobile parts and specialities in a plant on Monroe street.

French Bearings for American Market.

The Globe Ball Bearing Co., 50 Church street, New York City, has secured the American agency of the Societe de Mecanique de Precision of Clichy, France, manufacturers of the Duplex bearings. These Duplex bearings, as their name indicates, are designed to take care of both radial and thrust loads.

FRAMES BOB UP TO BOTHER ORSON

Parish Brings Suit Against the "Millionaires' Very Own"—Orson, Unabashed, Sets Up a Counter Claim.

When it was organized, some two years since, it was made appear that the Orson Automobile Co., then of New York City, was almost embarrassed by an abundance of capital and influence, while one hundred or more of the men of millions whose names are linked with Wall street were said to have subscribed for two hundred or more of the cars which were supposed to represent the rich man's idea.

Because of the names linked with it, the Orson company obtained reams of publicity but, despite the fact, it cut but a small figure in the industry; and that all was not smooth sailing, even in its days of affluence, was disclosed by a suit which has been placed on the current calendar in the Supreme Court for New York County, in which the Orson Automobile Co. is made the defendant.

The plaintiff in the case is the Parish Mfg. Co., of Reading, Pa. It alleges that on or about May 3, 1910, the Orson company gave it an order for 100 chassis frames which were to be made of "Parish special heat treated steel with an elastic limit of of "not less than 60,000 pounds to the square inch" and that the defendant company said it would furnish drawings and specifications. There was delay in furnishing specifications, the Parish people claim, and numerous changes were made in the specifications that were given. One frame was delivered, acording to the complaint, whereupon the Orson company asked for three more of the same kind at once. The frames were to cost $56 each. The delaying and changing continued, it is claimed, until July 26, 1910, when the order was cancelled—or as the complainant states, an attempt at cancellation was made. For materials secured, labor furnished and other items $501.11 is asked with an additional $1,000 for lost profits, making a total of $1,501.11.

The answer of the Orson company is to the effect that the Parish company was slow in filling the contract, that the frames were not according to specifications and that because of this delay the defendant was obliged to make preparations for securing its frames elsewhere, all of which is believed to be worth $2,000, which is the amount of a counter claim set up.

To Produce a Tire Filler in Elmira.

The Resillio Tire Filling Co. has been organized in Elmira, N. Y., and secured a plant at the corner of First and State streets, which will be under the superintendency of George B. Wilcox. As its title indicates, the company will manufacture a tire filling compound.

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Chicago, Ill.—Zilo Sales Co., under Illinois laws, with $30,000 capital; to deal in motor cars. Corporators—J. O. Barker, F. A. Alexander, F. E. Alexander.

Indianapolis, Ind.—Speed Motors Co., under Indiana laws, with $2,500 capital; to deal in motor cars. Corporators—A. C. Catterlin, N. Harden, L. O. Anderson.

Charleston, S. C.—Charleston Motor Sales Co., under South Carolina laws, with $20,000 capital; to deal in motor cars. Corporators—William Burguson and others.

Troy, N. Y.—Vanderheyden Garage Co., under New York laws, with $5,000 capital; to operate a garage. Corporators—William G. Pike, Eleanor M. Pike, Fred E. File.

Kenedy, Tex.—Kenedy Auto Supply Co., under Texas laws, with $3,000 capital; to deal in automobile supplies. Corporators—M. A. Nawman, Levi Pullin, V. A. Smith.

Birmingham, Ala.—New Taxicab Co., under Alabama laws, with $2,000 capital; to operate taxicabs. Corporators—F. G. Cheek, M. Boshwitz, Benjamin Boshwitz.

Tama, Ia.—National Auto Specialty Co., under Iowa laws, with $10,000 capital; to deal in automobile supplies. Corporators—E. E. Harlan, John Pitka, L. L. Hufford.

Bayside, N. Y.—Bayside Taxicab Co., under New York laws, with $5,000 capital; to operate taxicabs. Corporators—William Wagner, Charles B. Story, Charles Bonner.

Tama, Ia.—National Auto Specialty Co., under Iowa laws, with $10,000 capital; to deal in motor accessories. Corporators—E. E. Harlan, John Pitka and L. L. Hufford.

Lindell, Mo.—Lindell Auto Sales Co., under Missouri laws, with $3,000 capital; to deal in motor cars. Corporators—A. F. Grobel, Theodore Sepeier, Charles F. Beck.

Seattle, Wash.—American Motor Car Co., under Washington laws, with $20,000 capital; to deal in motor cars. Corporators—F. H. Boynton, Leonard McClure and others.

Sioux City, Ia.—Mandel-Frisch Auto Repair, Co., under Iowa laws, with $5,000 capital; to repair automobiles. Corporators—A. J. Mandel, August Frish and others.

Yonkers, N. Y.—Yonkers Auto Repair Co., under New York laws, with $1,000 capital; to repair automobiles. Corporators—Herman Flader, Albert Kipfer, Elizabeth Kipfer.

Waterbury, Conn.—Peterson & Nichols, under Connecticut laws, with $5,000 capital; to deal in motor cars. Corporators—Staveos F. Peterson, Emanuel Nichols, Telemahos Svores.

Springfield, Ohio—Gem Garage Co., under Ohio laws, with $10,000 capital; to operate a garage. Corporators—Charles J. Watts, R. M. Watts, Frank Eberie, C. M. Strunk.

Houston, Tex.—Hershoff Motor Car Co. of Texas, under Texas laws, with $5,000 capital; to deal in motor cars. Corporators—R. W. Johnson, E. L. Bender, Jr., W. F. Tarver.

Louisville, Ky.—Citizens' Taxicab Co., under Kentucky laws, with $10,000 capital; to operate taxicabs. Corporators—Charles T. Neale, Herman Morris, William Thomas.

Portland, Me.—Presto Inter-Rim Co., under Maine laws, with $200,000 capital; to deal in motor cars and appliances. Corporators—M. A. Thruston, H. P. Sweetster and others.

Wilmington, Del.—Morrow Gasolene Co., under Delaware laws, with $100,000 capital; to manufacture gasolene apparatus. Corporators—G. G. Steigler, E. S. Hollings, W. M. Pyle.

Rochester, N. Y.—Union Electric Car Co., under New York laws, with $5,000 capital; to manufacture motor vehicles. Corporators—Arthur McNall, Henry J. Schneider, Harry Pramer.

Toledo, Ohio—Toledo Metal Hub Co., under Ohio laws, with $20,000 capital; to manufacture vehicle parts. Corporators—Leonard Bauroth, Hugo Bickel, George Mannes and others.

Waterbury, Conn.—Todd Rubber Co., under Connecticut laws, with $2,000 capital; to deal in rubber goods. Corporators—E. J. Todd, F. H. Potter, New Haven; A. P. Gunn, Hartford.

Pomona, Cal.—Ranchers' Mfg. Co., under California laws, with $20,000 capital; to deal in motor cars. Corporators—A. Louise Whitehouse, F. E. Whitehouse, James E. Campbell.

Mansfield, Ohio.—Ideal Garage Co., under Ohio laws, with $6,000 capital; to deal in motor cars and operate a garage. Corporators—A. J. Summerville, W. J. Burrer, William C. Valentine.

New London, Conn.—Todd Rubber Co., under Connecticut laws, with $2,000 capital; to deal in rubber goods. Corporators—E. J. Todd, A. Wurts, New Haven; A. P. Gunn, Hartford.

Worcester, Mass.—Worcester Motor Co., under Massachusetts laws, with $30,000 capital; to deal in motor cars. Corporators—Victor J. Johnson, Charles J. Johnson, Frank L. Erickson.

Charlotte, N. C.—Como Automobile Supply Co., under North Carolina laws, with $50,000 capital; to deal in motor car supplies. Corporators—Morehead Jones, C. C. Coddington, M. M. Jones.

Camden, N. J.—Standard Auto Sales Co., under New Jersey laws, with $150,000 capital; to deal in motor cars. Corporators—C. H. Friars, E. H. Weaver, Philadelphia, and R. M. Snyder, Camden.

Indianapolis, Ind.—Henderson Motor Co., under Indiana laws, with $100,000 capital; to manufacture motor cars. Corporators—L. Carter, R. P. Henderson, C. P. Henderson, E. E. Rogers, C. S. Ricker.

North Plainfield, N. J.—Farmers' Garage, under New Jersey laws, with $24,000 capital; to operate a garage. Corporators—William H. Titus, N. H. Cleaves, George N. Winante, Charles C. Wheeler.

Dover, Del.—John G. Funk Combination Steel and Pneumatic Tire Co., under Delaware laws, with $200,000 capital; to manufacture automobile tires. Corporators—W. H. Kiser, W. K. Weaver, W. A. Knorr.

Proctor, Minn.—Proctor-Duluth Motor Co., under Minnesota laws, with $10,000 capital; to deal in motor cars. Corporators—J. J. Meehan, N. Downey, S. Hill, H. H. Hunter, W. J. Greene and others.

Providence, R. I.—Consumers' Rubber Co., under Rhode Island laws, with $600,000 capital; to manufacture rubber goods. Corporators—Percy W. Gardner, Alexander L. Churchill, E. Butler Moulton, all of Providence.

East Orange, N. J.—Eastern Motor Racing Association, under New Jersey laws, with $50,000 capital; to manufacture automobiles, etc. Corporators—H. H. Picking, C. O. Geyer, F. E. Ruggles, all of East Orange.

Clarendon, Va.—Ford Auto and Truck Co., under Virginia laws, with $25,000 capital; to deal in motor vehicles. Corporators—E. H. Bauer, and W. W. Barnes of Washington, and R. Gordon Finney, of Clarendon.

New York, N. Y.—Field Electric Bus Co., under New York laws, with $10,000 capital; to manufacture electric vehicles. Corporators—William Eastman, Roslyn; Cornelius J. Field, Burgess Osterhout, both of 135 Broadway.

St. Paul, Minn.—Northwestern Automobile Training School Co., under Minnesota laws, with $10,000 capital; to conduct an automobile school. Corporators—Hiram L. Bollum, H. J. Bollum, Redwing; M. E. Braun, St. Paul.

New York, N. Y.—Automobile Fault Finder and Anti-Forgery Electric Pen Co., under New York laws, with $50,000 capital; to manufacture automobile accessories, etc.

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Corporators—R. U. Conty, D. P. Ghadiali, H. Weinberger.

New York, N. Y.—Polack Tire and Rubber Co., under New York laws, with $700,000 capital; to deal in tires and rubber goods. Corporators—Max Polack, Adelbart Hanschild, Hugh Heffstaedter, all of Broadway and 59th street.

Brooklyn, N. Y.—Gayety Taxicap Co., under New York laws, with $500 capital; to operate taxicabs. Corporators—Hyman Peskin, 251 Wallabout street; Marcus Goldstein, 181 Penn street; Hyman Gordon, 788 Bedford avenue.

Bowling Green, Ohio.—Star Machinery and Garage Co., under Ohio laws, with $5,000 capital; to operate a garage. Corporators—E. H. McKnight, J. L. Smith, Milton T. Dilts, Ida May McKnight, A. Nanette McKnight.

New York, N. Y.—Magneto-Dynamotor Co., under New York laws, with $100,000 capital; to manufacture accessories. Corporators—George L. Henry, 612 West 138th street; Frank B. Moody, Battie T. Moodie, both of 55 Wall street.

New York, N. Y.—El Arco Radiator Co., under New York laws, with $10,000 capital; to manufacture automobile parts. Corporators—R. C. Gildersleeve, 27 West 30th street; C. Philip Coleman, Vernon Munroe, both of Englewood, N. J.

Grove Park, N. C.—Grove Park Motor Car Co., under North Carolina laws, with $20,000 capital; to manufacture and deal in motor cars. Corporators—E. W. Grove, St. Louis, Mo.; W. F. Randolph and John S. Adams, both of Asheville.

Brooklyn, N. Y.—Broadway Penn Garage, Inc., under New York laws, with $2,000 capital; to operate a garage. Corporators—Herman Goldstein, 181 Penn street; Meyer Kaplan, 394 Wallabout street; Hyman Meisel, 329 Kosciusko street.

Long Beach, N. Y.—Driggs Oil Co., under New York laws, with $1,500 capital; to deal in lubricants. Corporators—William S. Driggs, Long Beach; Abraham Lodholz, 418 Chestnut street, Brooklyn; Henry J. Frink, 1335 49th street, Brooklyn.

New York, N. Y.—Motorflex Euipment Co., under New York laws, with $150,000 capital; to manufacture automobile parts and accessories. Corporators—Rufus L. Patterson, 32 West Fifty-second street; Sydney I. Prescott, 277 Gates avenue, Brooklyn; Cahrles B. Goldsborough, 131 Woodland avenue, New Rochelle.

Changes of Capitalization.

Galion, Ohio—Howard Motor Co., from $300,000 to $6,000.

Cleveland, Ohio—Grant Motor Car Co., from $10,000 to $150,000.

Cleveland, Ohio.—Cleveland Motor Truck Mfg. Co. from $250,000 to $1,500.

Spokane, Wash.—Empire Tire Repair and Supply Co. from $5,000 to $6,000.

DEMOTCAR STOCKHOLDER DEFEATED

Claimed That False Representations Had Induced Him to Subscribe—Court Decides He Knew What He Was Doing.

An echo of the failure of the Demotcar Co., of Detroit, which went into bankruptcy a year and a half ago, was heard in the Wayne County Chancery Court last week when the suit brought by Emanuel E. Strubel against George T. Homeier, former superintendent of that company, was decided in favor of the latter.

Strubel alleged that he had been fraudulently induced by defendant to acept 750 shares of the stock of the Company at a valuation of $6,000, as part of the purchase price of a three-story brick apartment building in the city of Detroit valued at $16,000. On the representation of Homeier that the affairs of the company were in a very prosperous financial condition, that the car was "all right in every respect, had a fine engine, and the car was in point of design, construction and engine, every bit as good as the Hupmobile; that the output for the year would be 3,000 cars and that they were sold and that there was a big profit in the car." The complainant contended that at this time, in February, 1910, Homeier, as superintendent, was thoroughly familiar with the affairs of the company and knew that these statements were false, and that they were made to defraud complainant into accepting the stock.

Strubel claimed that he had no suspicion that the company was involved financially, until about May 20th, 1910, when he attended a meeting of its creditors called for the purpose of discussing its business affairs, at which meeting the company presented a report showing that it was apparently in a sound financial condition, but that it needed more capital to meet its needs, and it was announced that if the stockholders would subscribe and pay into the treasury, $25,000 for additional stock, the creditors would extend the time of their accounts for 20 months from September 1st, 1910, and permit the company to pay them at the rate of 5 per cent. per month.

Strubel alleged that shortly afterwards he was informed by Homeier that the entire $25,000 had been raised without difficulty and he therefore accepted the stock at the agreed valuation. He avers that it was not until after the company had been thrown into bankruptcy, in the Fall of 1910, that he learned from the receiver that this statement was false.

Homeier denied that he had made any of the several representations and asserted that Strubel had taken the stock at his own wish, and had stated that he was willing to take his chances. The Court found in favor of the defendant, holding that there had been no fraud practiced, and refused to set aside the contract as prayed by the complainant. It is understood that this decision will hold several other deals of a similar nature.

Sues Sub-dealer for Broken Contract.

Failure on the part of a sub-dealer to live up to the terms of his contract is named as the basis of an action for $948.93, brought by the Overland Sales Co., of New York City, in Supreme Court for New York county, against Frederick and Nicholas Koenig, Jr., brothers, of Tarrytown, N. Y. According to the complaint the Koenig brothers signed up as Overland dealers in Tarrytown, February 18, 1911, and agreed to take eight cars, their term of contract expiring July 31 following. At the time of executing the contract the complainant states the brothers gave as deposit a two months' promissory note for $250, took a car valued at $1095 and repair parts worth $26, which, under a 20 per cent. discount, should have netted the Overland Sales Co. $935.75 and $20.80. There also was a claim for $30 freight charges on the car. The $20.80 was left unpaid, however, and when the note was presented that also, it is claimed, was not met. The Overland company further alleges that but one of the eight cars contracted for was taken and asks commissions on the remaining seven amounting to $678.13, which with the note and the $20.80 amounts to a total of $948.93.

Trenton Bids for the Edwards Plant.

Although Trenton has held out "inducements" in an effort to get C. G. Stoddard and H. J. Edwards to locate their proposed factory for the production of the Knight-engined cars on New Jersey soil, that city is no more likely to draw the plum than is any other, according to Edwards. In the interim since the first announcement of the alliance between Stoddard and Edwards little has been done to settle the question of the factory site. Indianapolis was at one time favored, but at present its chances are about on a par with those of Trenton and several other cities.

Electric Truck Coming from Niagara Falls.

C. McK. Hepburn, of the Niagara Lead & Battery Co., and J. Clark, of the Clark Motor Co., Buffalo, which recently was merged with the Buffalo Electric Vehicle Co., have organized the Cleburn Motor Co., in Niagara Falls, N. Y., which will manufacture a 1,000-pound electric truck. As the Niagara Lead & Battery Co. manufactures the Salome battery, it goes without saying that the new truck will employ that source of current.

Gwilliam Gets the Standard Bearings.

The Gwilliam Co., at Broadway and 58th street, New York City, has been appointed distributors of the Standard Roller Bearing Co.'s productions for the Metropolitan District. It will carry a complete stock of Standard balls and Standard ball and roller bearings.

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George T. and William E. Clark are making ready to open a garage in Willimantic, Conn. It will be located on Main street.

The Columbus Buggy Co., of Kansas City, Mo., has gone into the automobile business as agent for Michigan cars. Its territory includes Western Missouri, Kansas and Northern Oklahoma.

Olney H. Redmond and L. R. Rogers, under the style Automobile Exchange Brokerage, will open for business in a few days at 775 State street, Schenectady, N. Y. They will handle second-hand cars.

Samuel E. Sherwood, Cleburne, Tex., has purchased an interest in the Layland & Miller Auto Co., the junior member selling his holdings. The name Sherwood supersedes the name Miller in the firm title.

W. A. Swain has purchased an interest in the automobile business of Simpson & Son, Gridley, Cal., and the firm style hereafter will be Gridley Garage Co. S. Simpson, C. Simpson and Swain comprise the firm.

F. F. Harrison has sold to John and R. C. Pierce, the South Pasadena (Cal.) Garage and Machine Shop, 1515 Mission street. The new owners will move the business to Fair Oaks avenue and Hope street.

The Modern Auto Machine Shop in San Diego, Cal., has been leased by W. J. Lustig and W. E. King. They will continue the business at the former address, 1140 Second street, under the style Pioneer Auto Brokers.

To handle Cole cars in Washington, D. C., G. R. Cowie has formed the G. R. Cowie Co. and leased salesrooms at 1315 H street, N. W. Cowie's associates in the business are J. B. Chapin, R. C. Wilson and C. C. Campbell.

Alpheus B. Cochrane, principal stockholder and manager of the Queen City Garage, Cumberland, Md., has sold his interests to William S. Burger, who, with Benjamin H. Blays, the other stockholder, will continue the business.

Ralph Widdifield has sold his interest in the Auto Inn at Van Buren and Washington streets, Columbia City, Ind., to Adam Rumsyre; the new firm will be known as Waterfal & Rumsyre. The firm conducts a garage and sells Ford cars.

The Frank G. Fickling Co., automobile supply house at 1110-12 Fourteenth street, Washington, D. C., has changed its name to the F. K. B. Co. These are the initials of Fred K. Barbour, who was made president following a reorganization.

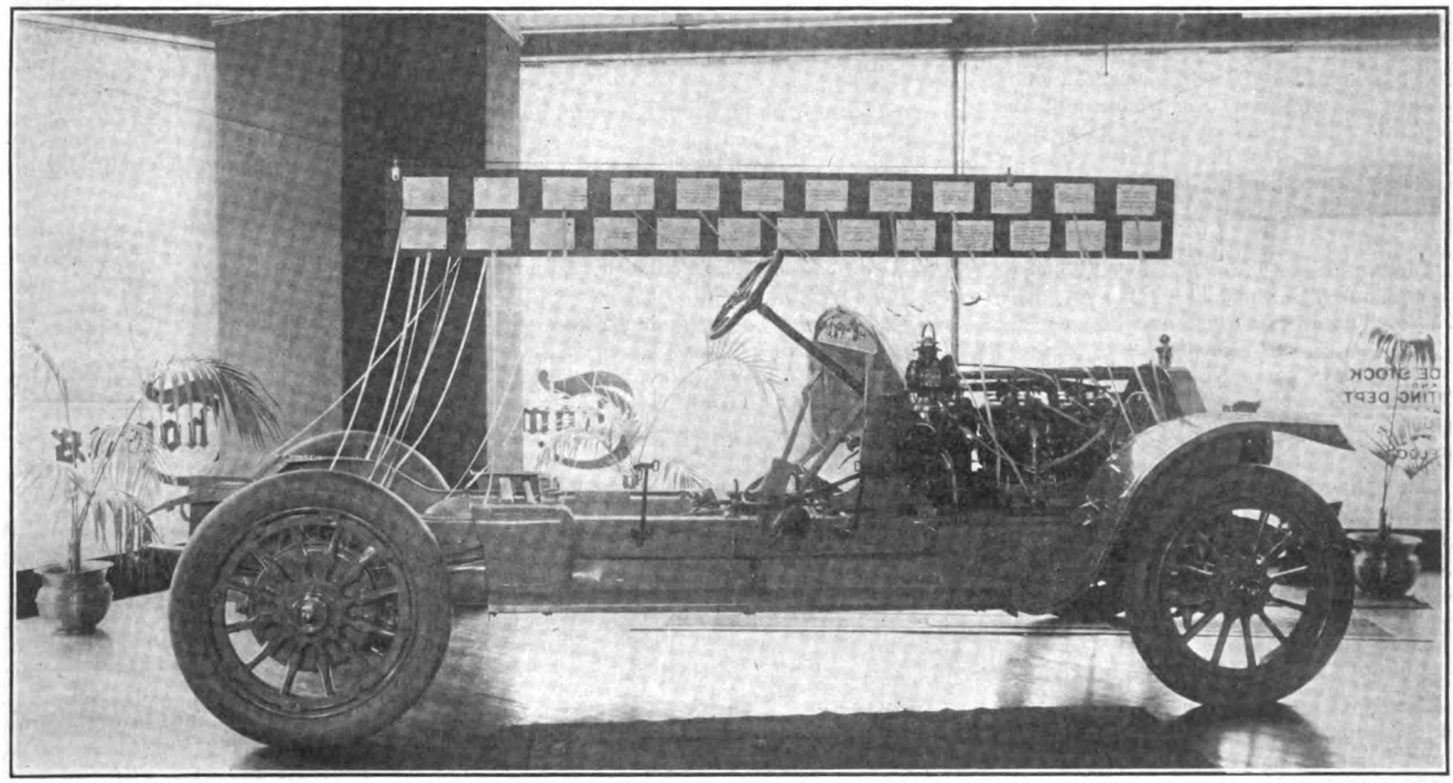
R. A. Stevens and W. J. Casterton have formed the Tire & Auto Service Co. in Detroit, where they are quartered at 1580 Woodward avenue. While tires will constitute their chief stock in trade, a general line of accessories will be handled.

John C. Belloff has had plans drawn for a new garage on Albany street, New Brunswick, N. J. It will be two stories, have 100 feet front, and will contain clubrooms for chauffeurs and waiting rooms for women. Its cost is estimated at $40,000.

Radel & Ochs have secured a permit to make extensive alterations in the Public Service car barn in Lincoln avenue, near Main street, Orange, N. J., and will remodel the structure into a garage. It will be operated under the style Lincoln Avenue Garage.

Frank H. Strong, who has conducted an automobile repair business in West Hart-

MAKING PLAIN THE "TALKING POINTS" OF THE THOMAS



How a six-cylinder chassis on view in the Broadway window of the New York Thomas Motor Co.'s salesrooms is turned into a "silent salesman" with the aid of ribbons and explanatory cards

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ford, Conn., has acquired an interest in the Sewell Garage on Smith street in that city, of which he will be in immediate charge. Strong & Shattuck will be the new firm style.

The Motz Tire & Rubber Co., of Akron, O., has opened a branch in Cleveland, at 2352 Euclid avenue. It is in charge of C. R. Serfoss.

The Jenet Supply Co. has commenced business in the Navarre Building in St. Louis, Mo. It will devote itself wholly to the handling of electrical automobile specialties.

William Hellen, formerly sales manager for the W. L. Huffman Automobile Co., Omaha, Neb., has bought an interest in the Independent Garage, Twenty-fourth avenue and Farnam street. R. A. DeWitt, who has been with the Omaha Motor Car Co., takes Hellen's former position.

The Spokane (Wash.) Electric Vehicle Co. has been organized and will handle Woods electrics and the products of the General Motors Truck Co. of Detroit. Temporary quarters have been secured at 331 Post street pending the completion of a garage and salesrooms at 1023 Third avenue.

The National Motor Goods Co., which is an offshoot from the Jenkins AutoSpecialty Co., of Sumter, S. C., has opened up in St. Louis, Mo., at 3937 Olive street. Thomas J. Ryan, who came from Sumter to take charge, is manager of the establishment, which will conduct a purely wholesale business.

The Kissel Motor Car Co.'s Chicago branch has leased the four-story building at 26th street and Wabash avenue, which gives to it the distinction of occupying the largest structure devoted to the automobile business in Chicago. The building is 120 x 199 feet and provides nearly 100,000 square feet of floor space.

The MacEwan-Webster Automobile Co., of Swift Current, Sask., Can., has secured the Cartercar agency for the provinces of Saskatchewan, Alberta and Manitoba. While headquarters will remain in Swift Current, the MacEwan-Webster company will open a branch in Winnipeg to better handle the business in that territory.

Following the failure of the White Motor Car Co., of Portland, Ore., the White dealer in that city, the parent company, of Cleveland, Ohio, is establishing a factory branch in Portland. E. W. Hill, a factory representative, who is directing the work at present, has secured the old location and engaged a number of the employes of the old concern.

David C. Riekse, for several years connected with automobile affairs in Grand Rapids, Mich, and until recently agent for Cutting cars, has sold that business to his cousin, Henry J. Riekse, and another man, and will retire from the automobile trade. The business will be conducted under the name Riekse Automobile Co., at the old address, 11 Island street.

The Pacific Motors Co. and the Gerlinger Motor Car Co. have been organized in Portland, Ore., the former to handle the Oakland and the latter the Pathfinder car. G. G. Arnold, formerly a salesman for the H. L. Keats Auto Co., is the head of the Pacific Motors Co., and E. E. Gerlinger, of the Stoddard-Dayton Auto. Co., is the principal member of the concern which bears his name.

The Henry A. Rowan, J., Automobile Co. has just been organized to sell Cole cars in Philadelphia, Pa. Showrooms have been opened at 612-14 North Broad street and a service station with 30,000 feet of floor space at 2028 Sansom street. For seven years Henry A. Rowan, Jr., the president, has conducted a garage at the Sansom street address. W. B. Danenhower, who is vice-president and general manager, has been connected with the Pierce-Arrow and Peerless agencies and lately with the Sweeten Automobile Co., the Franklin dealer in Philadelphia.

Changes Among Prominent Tradesmen.

Clifford Talbot has resigned the superintendency of the Cartercar factory in Pontiac, Mich. He has returned to his former home in Kingston, N. Y.

C. O. Dail has been appointed manager of the Kansas City branch of the Swinehart Tire & Rubber Co. Previously he was one of the company's traveling staff.

Frank C. Rulon has been appointed manager of the International Motor Co.'s Chicago branch. Previously he was connected with the Philadelphia establishment of the same company.

Charles R. Feeley has been appointed publicity manager for the Metzger Motor Car Co., of Detroit. Previously he was a traveling passenger agent for the Louisville and Nashville Railroad.

H. A. Worman has been appointed advertising manager for the Baker Motor Vehicle Co., Cleveland, O. He has had ripe experience in the advertising field, latterly having had charge of the advertising department of the National Carbon Co., of Cleveland.

John Jordan, for the past several years identified with the Diamond Rubber Co., of New York, has resigned that connection to become treasurer of the Century Tire Co., of New York. He will also serve as assistant sales manager of the latter company.

Harry Knepper, manager of the Warner Instrument Co.'s Boston branch, has been transferred to the management of the Warner establishment in Detroit. J. C. Moore, who was in charge of the New York branch, has been transferred to Boston to fill the vacancy created by Knepper's removal.

C. C. McKinney has been appointed superintendent of transportation of the Dayton Automobile Truck Co.'s Chicago branch, with headquarters at 1700 Wabash avenue, where the Dayton company's advertising and publicity departments will be located. Heretofore McKinney has been connected with a commercial vehicle publication.

Roy A. Faye has resigned the management of the Matheson Auotmobile Co.'s branch to become general manager of the C. R. G. Mfg. Co., makers of the C. R. G. carburetter, which company he organized several months since and in which he is financially interested. R. G. Nelson has succeeded to the Matheson management.

William Glossbrenner has been appointed purchasing agent for the Grant Motor Car Co., of Cleveland, O. Although latterly he has been engaged in the automobile business in Canada, Glossbrenner at one time was connected with the Haynes Automobile Co., of Kokomo, Ind., of which Harry H. Elmer, president of the Grant company, once was general manager.

Recent Losses by Fire.

Lismore, Mich.—Peters & Greig, garage, destroyed. Loss, $7,000.

Jonesboro, Ga.—Jonesboro Anto Co., garage, damaged. Loss, $1,000.

Detroit, Mich.—United States Auto Supply Co., 372 Michigan avenue, damaged. Loss, $4,000.

Cincinnati, Ohio—Prest-O-Lite Co., 118 East 9th avenue, damaged, by explosion and fire. Loss, $2,000.

Omoha, Neb.—Nebraska Cartercar Co., 1113 Farnam street, garage and salesrooms, damaged. Loss, $8,000.

Richmond, Va.—Frederick E. Murphy Automobile Co., 300 3d avenue, garage, damaged. Loss, $1,000.

Detroit, Mich.—Wolverine Motor Casting Co. and Wolverine Motor Supply Co., 210 Catherine street, destroyed. Loss, $5,000.

Atlanta, Ga.—Purcell Auto Garage, 38-40 Auburn avenue, partially destroyed. Loss, $33,000. Puncture Proof Tire Co., on second floor, loss, $3,000.

More Room for All-in-One Spark Plug.

The Frontier Specialty Co., which manufactures the All-in-One spark plug, has leased larger quarters in the building at 732 Main street, Buffalo, in which it has been located. The new offices are nearly three times the size of the old ones and were rendered necessary because of the increase of business.

Hupp Brothers Buy More Real Estate.

Robert C. Hupp and Louis G. Hupp have purchased eight acres of land, having a frontage of 900 feet on Lycaste avenue, in Detroit, and which directly adjoin the property on which the factory of the R. C. H. Corporation now stands. The purchase is accepted as indicating a substantial enlargement of the R. C. H. plant.

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"SIX" SITUATION THAT MAKES FOR CAUTION.

Foreshadows of increasing strength make plain that the six-cylinder car will cut a large figure in the trade of next year and thereafter—exactly how large is one of the problems that confronts the industry and that serves to cause discomfiture in many directions.

With but few notable exceptions, the "six" heretofore has been the product only of what may be styled the high-priced manufacturers, and has been viewed rather in the light of a luxury for those to whom price is of small moment. It has been a plant of slow growth and requiring rich soil, so to speak, but slowly and surely it has attained proportions that no longer can be disguised or denied, and it now must enter seriously into the considerations of even the manufacturers of what are styled popular-priced cars. It already had been embraced by a few of the latter, and their number is on the point of being so greatly increased that safe prophecy regarding the relative output of and demand for "fours" and "sixes" is not possible.

It is not likely that there will be a stampede to "sixes," and the fact that the larger engine manufacturers now are in position to supply such engines will somewhat relieve the situation by making easier the ready assemblage of such models, should occasion require; but the fact remains that the strength of the movement toward the "six" is so strong as to prove disconcerting and give pause to a considerable portion of the industry.

The situation contains all of the elements which marked the transition of the trade from "singles" and "doubles" to "fours." It has been brought about as steadily and as quietly, and the same shock of surprise is felt as was experienced when it was realized that the four-cylinder motor had become the standard type. It may be too much to say that the existence of the four-cylinder car has been seriously challenged, but whatever may be said, it is certain that there is need for caution and conservatism all along the line.

THE ADVANCE IN GASOLENE AND ITS EFFECTS.

Perhaps the supply of gasolene has fallen off to the extent of 56 per cent. during the course of the last six months, or perhaps the demand may have increased in the same proportion, but it will take more than mere assertions to carry conviction. Certainly the demands of the automobile market have not increased to an extent that justify anything mildly suggestive of such an advance, and the regularity with which one cent has been added to the price of the fuel indicates that the cause must be sought elsewhere. From the outside, it looks as if the advance in price is largely, if not wholly, an arbitrary one.

In the aggregate, the increase will amount to a prodigious sum, and by far the larger proportion of it will be extracted from the pockets of those who have to do with motor vehicles. While those who operate pleasure cars, and who rarely count the cost, may be little concerned, the astounding advance in the price of fuel cannot but unfavorably affect the truck situation. There are many heavy vehicles working under adverse conditions which regularly average less than two miles per gallon, and on these the price increase falls heavily. It brings the cost of fuel for such trucks from about six cents to nine cents per mile. In the case of lighter trucks, averaging, say, six miles per gallon, the cost rises from 1.5 cents to 2.3 per mile. When fleets of trucks are operated, these items mount into very considerable figures.

The cost of fuel enters into all estimates, and while the high cost born of the present price of gasolene may not actually prevent sales of trucks, that it will unpleasantly affect the prosecution of such sales is undoubted.

Gasolene may be said to be a staple article, and when the price of most staples rises there is at least an attempt made to justify such increase. While the supply and demand explanation is made to cover a multitude of sins, it is difficult to justify its employment in this case. The situation is one that gives point to the demand for devices that will permit the use of heavier and cheaper fuel, and it is to be hoped will turn inventive faculties more earnestly in that direction.

TIME TO "LOOK INTO" THE MUFFLER.

If it has served its purpose, the outcry against muffler cut-outs and the repressive legislation that has been enacted, and is still being enacted, should have directed the attention of not a few designers to the mufflers with which their respective cars are equipped. The cut-out simply must go, and the sooner the fact is realized in every automobile factory in the land the better it will be for all concerned. There are abundant examples to prove that noise is not a necessary element of an efficient muffler. It is possible that wholesale arrests will result before the lesson is fully learned, but with the foreshadows so distinctly outlined, the wise man will take time by the forelock.

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PRICE OF GASOLENE AGAIN GOES UP

"Supply and Demand" Add Another Cent, Making Fifth Advance in Six Months—Increase Exceeds 55 Per Cent.

"Good old Supply and Demand," which of late have been perniciously active in respect to the price of gasolene, once more have accomplished their work, and the price of that fuel now stands at 14 cents per gallon, delivered at New York garages. Another cent was added to the price on Monday last, 13th inst. In October, it stood at nine cents; by the end of February it had advanced to 12, and on April 25th last it was pushed up to 13 cents, where it stood for just about two weeks. The increase from nine cents to 14 cents, which has been brought about within a period of six months, amounts to practically 56 per cent., and the suspicious regularity with which the advances have been made suggests that the limit has not yet been reached.

Efforts to obtain explanations at the Standard Oil headquarters in New York were unavailing. In every instance, Supply and Demand are brought out and make to execute a "turkey trot" which is designed to sway the senses. No attempt is made to demonstrate when, or where, or how Supply dropped 56 per cent. or Demand executed an upward leap of the same proportions. The old familiar Siamese twins who have served so many purposes are simply paraded and made to perform the duty they have performed for so many generations.

It is true that Uncle Sam recently went gunning for Standard Oil and caused it to scatter, thereby entailing great expense, but it is strenuously denied that the action of the government had anything whatsoever to do with the remarkably rapid increase in the price of gasolene.

The only other explanation that has been vouchsafed has come from a New England oil man, who declares that the advance is due to the fact that the Standard Oil Co. having been caught on long-term, low-priced contracts has adopted the present method of "striking a balance." The 14-cent price to New York garages covers the cost delivered in steel barrels, which form of delivery corresponds to tank wagon delivery elsewhere, the latter being prohibited in New York City.

The individual consumer who buys one steel barrel of gasolene, delivered into his private tank and the barrel returned to the oil company, pays 16 cents, unless he buys five or more barrels when the price is 15 cents. Wood barrel delivery, where the consumer keeps the barrel until empty, is 17¾ cents, and when the barrel is returned, if it is, the consumer gets a rebate of $1.30. Fifty gallons to a barrel, the average contents, makes the wood barrel delivery cost about 15 1/6 cents, if the barrel is returned.

Lubricating oil, according to Standard Oil figures, has shown little such activity as compared with gasolene. Little change has been made in price. Polarine, which is the standard product of this company, is listed at 35, 36 and 45 cents a gallon, according to how purchased. This is the garage man's figure. That for individual consumers is about one-third higher.

Accident Insurance Takes Queer Turn.

An accident of three years ago, when a car owned by the Willis Cab & Auto Co., of New York City, struck William Fickert, has dragged its way through the courts until it now takes the form of an action in the New York Court of Appeals by the Willis Cab & Auto Co. against the General Accident, Fire and Life Assurance Corporation. For his injuries, Fickert secured a judgment of about $400, which was satisfied. The cab company then sued the insurance company, claiming the sum should be paid by the latter, as it carried the cab company's accident insurance. A counter claim of $370 for unpaid premiums was entered, and judgment for this amount was secured by the insurance company in the Supreme Court. The appeal taken by the cab company in an effort to reverse this judgment, is now on the calendar.

Franklin Finds the West Prosperous.

H. H. Franklin, president of the H. H. Franklin Mfg. Co. and of the Franklin Automobile Co., returned last week from his annual visit to the Franklin dealers and agencies in the Middle Western States and on the Pacific coast. His views are distinctly optimistic.

"Conditions throughout the West," said Mr. Franklin, "show a decided improvement since my last trip. On the Pacific coast the growth of the larger cities and increase in the automobile business is especially noticeable. But in every city in which I stopped, from Cleveland, through the Middle West and Coast country and return to Milwaukee, there is a live interest in the automobile trade and our dealers and branches have been largely benefited by the prosperous trend of things."

Fulton-Grubb Gets Water Circulator.

The Fulton-Grubb Co., Chicago, Ill., has secured control of the entire output of "T-H" water circulators, and the manufacturer of the device, the Thorndike-Hutton Co., is preparing to move its plant from Sioux City, Ia., to Chicago. No definite location has been decided upon as yet, however. As the name of the device implies, the "T-H" water circulator is intended to assist in cooling a motor by supplementing thermo-siphonic action with positive circulation under all running conditions. It consists of a simple cast aluminum manifold containing a loosely fitting worm screw driven by belt from the fan pulley or any other convenient rotating shaft, the whole device being intended to replace the usual water manifold on thermo-siphon cooled engines. The cooling water is piped into the device from the bottom of the radiator and as the screw rotates it forces the water to circulate. The construction is such that should the screw fail to rotate for any reason the circulation of water continues, the reason being that there is ample space between the screw and the manifold walls.



May 18, Washington, D. C.—Sociability run of the Washington Automobile Club.

May 25, Newark, N. J.—Motor truck parade under the auspices of the Newark Automobile Dealers' Association.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

Cadillac and Long Both to Enlarge.

To provide for the great overflow of its business, the Cadillac Motor Car Co., of Detroit, has purchased the real estate and plant of the Long Mfg. Co., in that city. The land, most of which is occupied by a two-story factory building, has a frontage of 320 feet and a depth of 145. The Long company, which manufactures radiators, will remove to Grand Boulevard and Cameron avenue, where it has purchased a site, 270 x 120 feet, on which will be erected a plant twice the size of the one sold to the Cadillac interests.

Bankruptcy Befogs Friedman's Goggles.

Benjamin Friedman, who manufactured automobile gogles on a limited scale at 315 Pearl street, New York City, has been petitioned into involuntary bankruptcy. His liabilities are placed at $23,000.

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DECLARES TRIPLE TAXATION LEGAL

Indiana Judge Rules State and City Both Entitled to Automobile Money—Motorists Lose Test Case.

In Indianapolis, Ind., at least, it is legal to tax motor vehicles three times, that is, if the decision just rendered by Judge Remster in the Circuit Court of that State has been correctly interpreted. A state tax, a tax imposed by the municipality under the heading of property, and a special city license tax all are legalized by the ruling.

It was a fight—a test case against the local license tax that was settled by Judge Remster. The tax was opposed on the grounds that double taxation by a municipality is unconstitutional, and also because the ordinance under which the tax is levied is invalid since it does not specify that the money derived from the sale of licenses shall be used for improving the streets, but the Court ruled against both contentions.

"The people have granted all legislative authority to the general assembly," said Judge Remster. "By Section 1, Article 4, of the Constitution, the people transferred all their legislative power to the general assembly. Included in this power is the power of taxation.

"The legislature being vested with all power to tax may levy a tax, conforming to constitutional restrictions, upon the property engaged in any business, and in addition thereto, levy a special occupation tax for the privilege of carrying on the business. Neither is this double taxation within constitutional prohibition."

The limitation placed on the general assembly by the Constitution is as follows: "The general assembly shall provide by law for a uniform adequate rate of assessment and taxation and shall prescribe such regulations as shall secure a just valuation for taxation on all property, both real and personal, excepting such used only for municipal, educational, literary, scientific, religious or charitable purposes as may be especially exempt by law."

"The foregoing," said Judge Remster, "is the only limitation placed on the legislature on the exercise of the power of taxation. Otherwise it is unlimited.

"For taxation purposes the city has only such power as has been expressly delegated to it. It has no implied powers of taxation. The city charter of 1905 contains the powers expressly delegated to the city. Section 8655, Burns' statutes, 1908, contains the delegation of the power. Clause 32 is in the following language: 'To regulate, tax and license coaches, hacks, drays, automobiles and all other vehicles.'

"This is an express delegation of power. The city was expressly empowered to regulate vehicles in the use of the streets and exact a license in such an amount as would probably cover the expense of enforcing such regulating ordinance. There is further the expressed power to tax vehicles for the privilege of using the streets. The first is a delegation of power to regulate. The second is a delegation of power to tax.

"By the first the state is delegating to the city a portion of its police power to regulate the use of vehicles in the street. By the second the state is delegating to the city a portion of its power to tax vehicles for the privilege of using the streets."

Route of Four States Tour Settled.

Having completed their work, the men who piloted the Great Western pathfinding car over a trail of some 1,280 miles, have reported results to the Indianapolis Automobile Manufacturers' Association, and the route and dates for that organization's "Four States Tour" have been definitely settled. The route leads through many of the larger cities in Indiana, Ohio, West Virginia and Kentucky, and will be covered by the Indiana boomers between July 9 and 24. The itinerary as mapped out is as follows:

July 9—Indianapolis, Noblesville, Kokomo, Wabash, Huntington and Ft. Wayne.

July 10—Ft. Wayne, Ind.; Van Gert, O., and Lima, O.

July 11—Lima, O., Fostoria, O.; Fremont, O., and Tiffin, O.

July 12—Tiffin, O.; Bucyrus, O.; Mansfield, O., and Akron, O.

July 14—Akron, O., and Canton, O.

July 15—Canton, O., and Wheeling.

July 16—Wheeling, W. Va., Cambridge, W. Va., and Zanesville, O.

July 17—Zanesville, O., Newark, O., and Columbus, O.

July 18—Columbus, O., Lancaster, O., and Washington Court House, O.

July 19—Washington Court House, O., Chillicothe, O., and Portsmouth, O.

July 20—Portsmouth, O., Catlettsburg, Ky., and Huntington, W. Va.

July 21—Huntington, W. Va., Kenora, W. Va., Portsmouth, O., Peebles, O., and Maysville, Ky.

July 22—Maysville, Ky., Paris, Ky., Winchester, Ky., and Lexington, Ky.

July 23—Lexington, Ky., Frankfort, Ky., Shelbyville, and Louisville, Ky.

July 24—Louisville, Ky., Jeffersonville, Ind., Seymour, Ind., Columbus, Ind., and Indianapolis.

Herrick Completes Cross-Continent Trip.

Harvey Herrick, the well known race driver, has enrolled himself among the "transcontinentals" also. Accompanied by a Hearst reporter, he arrived in New York on Wednesday, 8th inst., behind the wheel of a Case car, after a 42-day grind from Los Angeles, Cal. The professed purpose of the trip, which was jointly managed by the Ocean-to-Ocean Highway Association and the Hearst newspapers, was to blaze a trail for a national highway across the country. Herrick left Los Angeles on March 27th and averaged about 100 miles per day.

"WIN" BARNDOLLAR FAILS TO WIN

Asks Court to Help Him Hold His Racing Job but Suit Fails—Bruce-Brown to Pilot National.

Because it is stated Winifred Barndollar failed to "make good" in practice for the forthcoming 500-mile race on the Indianapolis Speedway on Decoration day in the estimation of the White Motor Car Co., of Indianapolis, which has entered a White Six, he was invited to step down and surrender the car to other and worthier hands. Consequently it is altogether likely that when the White comes to the line it will be under the persuasion of some other driver. It was just such a contingency that Barndollar foresaw and attempted to forestall when he was told that his services were no longer required. He immediately applied to the Superior Court in Indianapolis and was granted a temporary injunction restraining John H. Darlington and D. Eaglesfield of the White company, or anybody else, from "tuning up" the car or driving it in the race. He said their action injured his reputation—made a Barndollar look like a plugged penny, so to speak. But though the final hearing of the case was set for May 21st, when Barndollar expected to obtain a permanent injunction, the case was thrown out of court because of Barndollar's inability to furnish a bond. Another important change in the line-up which has been made, and one which may place quite a different aspect on the order of finish, is that David L. Bruce-Brown, who drove a Fiat into third place in last year's race and whose fame was further spread by the acquisition of the coveted Grand Prize last Fall, at Savannah, has been nominated to drive a National, which was almost as unexpected as Barndollar's unusual action. Don Herr's seat in one of the other National entries has been taken by Joe Dawson. Howard Wilcox is the third driver in the formidable National team.

Still another development of the situation is the objection raised by the Mercer Automobile Co. to Len Ormsby, who has been nominated to drive the Opel entry. Ormsby is the man who is held responsible for the accident at Brighton Beach last year that resulted fatally for H. Frey, who was driving a Mercer. At that time his A. A. A. card was revoked, and the Mercer company does not believe he is any more competent to drive, but as he now is in good standing in the American Automobile Association, the Opel company insists that he will drive despite the objections.

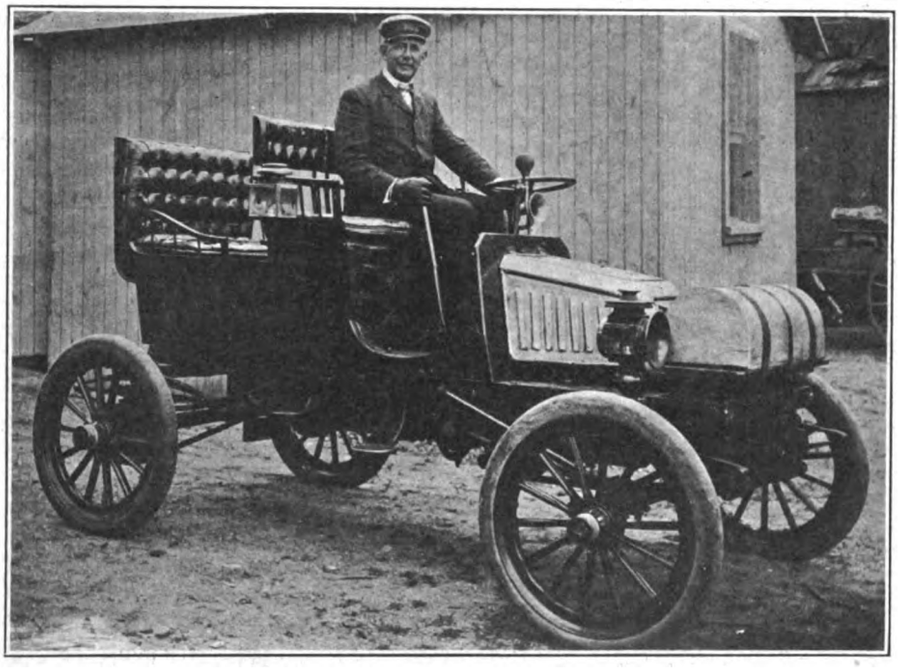
Of the 27 cars that are entered, 16 already are on hand, though no light has been shed as yet on the "unknown entry." Other cars are appearing almost every day and the "work-outs" have taken a more serious turn, to the joy of the "railbirds."

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FIRST AMERICAN 4-CYLINDER CAR

New Jerseyman Who Built It Produces Picture to Prove His Claim—Finished It During 1901.

Supplementing the brief description of what is claimed to be the first four-cylinder motor car built in the United States, published in the Motor World of April 18th last, the accompanying illustration shows the machine as it stands today. Considering the fact that it was finished in 1901, it is by no means as antiquated in appearance as might be expected, and despite its comparatively advanced age it still is capable of running, though of course at a very moderate speed. The motor is a 10 horsepower Buffalo and is set in the usual fore-and-aft position, driving through a planetary change gear, jackshaft and double chains.



FIRST AMERICAN FOUR-CYLINDER CAR AND ITS BUILDER, F. F. SMITH

The builder of the machine, Fred F. Smith, of Bridgeton, N. J., who carried out the construction at odd times in his own machine shop, says that the car bears a strong resemblance to the French machines of that date, which he saw at the automobile show in Paris in 1900. The extra tank in front, however, probably is unlike anything that Smith saw at the French capital, and is designed to carry an extra supply of gasolene, for at that time this fuel was by no means as easily obtained as it now is, and a liberal supply on hand was the only safe thing—the proverbial bird in the hand.

That the car was well built is indicated by the fact that Smith made a tour of 1,000 miles very soon after its completion. The tires were of the single tube type; chains and sprockets were of hardened steel and ball and roller bearings were used throughout. Incidentally, it cost Smith $1,000 to build the car and required a considerably longer time than is required in turning out cars today.

Action Against Winton Company Collapses.

For failure of the complainant to prosecute, an action for damages to his automobile while it was in storage with the defendant, brought by Francis J. Hobson against the Winton Motor Carriage Co., was this week dismissed by the Supreme Court for New York county. The action was against the company which makes Winton cars, but the dealings in question were with its New York branch. Hobson claimed he stored his car with the Winton branch, and that while he was in Mexico it was taken out and used, contrary to his orders, that he paid for repairs and maintenance, and that when he returned he found the car so damaged as to be of no use to him. He asked $1,732.50. A counter claim was set up by the Winton company for $187.50, on the grounds that the car had been in storage since July 31, 1907, and that the storage was never paid. The Winton company also claimed it had reason to believe the car was owned by one George W. McElhiney, and that he had legal custody of it. It is also stated that McElhiney paid such bills as were paid.

Japanese to Manufacture Motor Cars.

According to newspaper advices from the Far East, a million dollar company is being formed in Tokyo to manufacture autobiles and bicycles. More than seventy of the leading business men of the Japanese capital are said to be interested in the enterprise.

NIMBLENESS WINS OVER POWER

Light Weight With Speed Makes Better Showing Than Ponderous Power—Battle of Beer-Hauling Trucks.

Always an advocate of light weight and liveliness in motor cars, the Franklin Automobile Co., of Syracuse, N. Y., finds added reason for this viewpoint, so far at least as commercial vehicles are concerned, in the result of a test recently made between two trucks, one a Franklin one-ton machine and the other a seven-ton car of another make. The test, or contest, was carried out at the plant of the Fuhrmann & Schmidt Brewing Co., of Shamokin, Pa., and consisted in hauling half-barrels of beer for seven hours. The Franklin truck was handled by one man, who did all the loading and unloading, while there were two men regularly on the seven-ton machine and another man helped.

The one-ton truck carried fourteen loads of fourteen half-barrels each, or a total of 196 half-barrels, while the big machine transported three loads of 66 half-barrels, or a total of 198 half-barrels. When the heavy truck finished its third trip there was still an hour left of the eight-hour working day, but in order to carry a fourth load, which would have taken two hours, it would have been necessary to pay for the time beyond the eight-hour limit at the rate of time and a half, so the remaining hour was not utilized. The Franglin truck was stopped at the same time, so that the actual working time was the same in the case of both machines. Figuring on this basis, it was calculated that in a full eight-hour day the big machine would haul 264 half-barrels and the little Franklin 224; but that the difference in the matter of load carried in favor of the heavy machine was more than offset by the much smaller amount of wages paid in the case of the Franklin, together with a certain economy in the matter of fuel and oil consumption and tire wear and tear. The direct result of the trial, which was the culmination of the work of several months on the part of both machines, was the abandonment of the big car and the assumption of its work by the Franklin.

Dinner That Advertised an Electric.

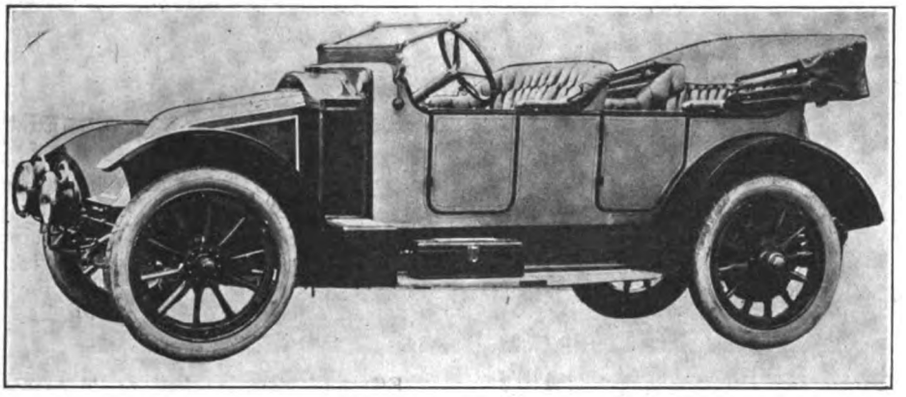
Formulating "stunts" as publicity getters keeps many active minds busy and many are the advertising schemes which loom big in the minds of their promoters but which do not make the anticipated "hit." One of the most unusual "stunts" which has been projected in some time recently was carried out in Chicago by J. B. Dignam, advertising manager of the Borland-Grannis Co., maker of the Borland electric brougham. Dignam called it a "merry-go-round" dinner. It consisted of five courses, served at five different hotels, and the guests were carried from hotel to hotel in a number of Borland electrics.

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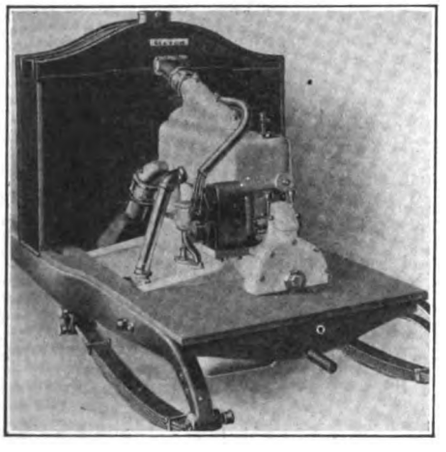
FOURS AND SIXES IN KEETON LINE

Long Stroke Motor and French Type Radiator a Feature of Both—Wire Wheels Optional on the Six.

With its capitalization increased from a nominal amount of $10,000 to $300,000 and arrangements made for a modern brick and concrete factory the recently organized Keeton Motor Car Co., of Detroit, is planning to build not only four-cylinder cars, but six-cylinder models also, all of them of the French type with forward sloping hoods and dashboard radiators. Of the output in view, 1,500 machines, one-third will be "fours" and the other thousand "sixes." Forrest Keeton is president of the new company, and it is understood he is to be its general manager also. W. C. Houck, of New York, formerly sales manager of the American Locomotive Co., is vice president, Wm. Van Moore treasurer and N. T. Brotherton secretary.



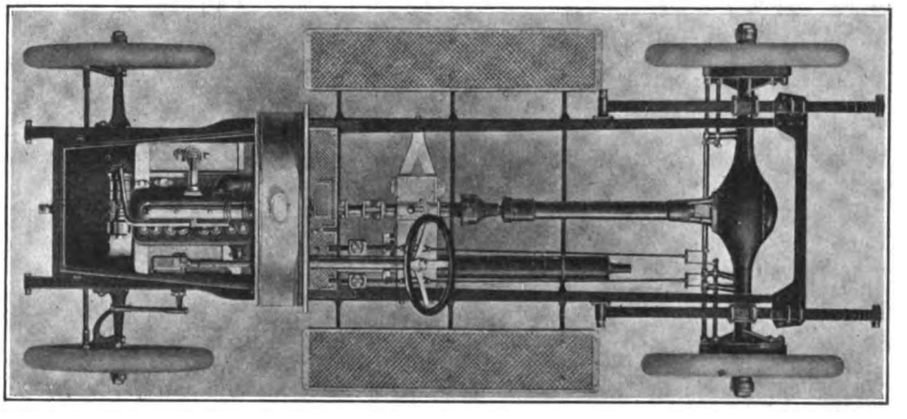
THREE-QUARTER VIEW OF KEETON FOUR-CYLINDER TOURING MODEL



KEETON ENGINE AND RADIATOR

In the design of the new Keeton cars free use has been made of features that have become familiar in cars of foreign origin, the Renault, for example. The arrangement of the radiator at the back of the engine space, the back-tilting hood and the exceptional accessibility of the motor are commendable points that long have been appreciated abroad and have gained a strong foothold in this country, while the block cast motors with enclosed valve mechanism and thermo-syphon water circulation are clean in appearance and easily kept free of dust, especially as there is no dust-laden blast of air from the front.

While the four and six-cylinder models are alike in their general outlines and in design, there are a few differences in details besides the difference in the number of cylinders. The four-cylinder model, which is the one shown in the accompanying illustrations, has its cylinders cast in a single block, while in the six-cylinder model they are cast in pairs. The larger model has cylinders with a bore and stroke of 3.75 inches and 5.25 inches respectively and is rated at 42-48 horsepower, while the corresponding figures for the four are 3.74 inches and 5.25 inches, and the rating 34-38 horsepower. In both motors the cylinders are offset. The wheelbase of the "six" is 131 inches and that of the "four" 120 inches, and in the case of the six the option is given of wood or wire wheels. With these exceptions the cars are alike, though the description that follows is that of the four-cylinder machine. Both have left-hand steer and centre control.



PLAN VIEW OF KEETON CHASSIS, SHOWING ITS SIMPLICITY

The motor is of the L-head type, with valves on the left side, the stems and springs being covered by light plates of aluminum. The water circulation pipes are extremely large, as is consistent with the thermo syphon circulating system adopted. A dual ignition system is installed, consisting of a Bosch or Eisemann high-tension magneto and a storage battery for the alternative source of current; the ignition timing is fixed. The magneto is carried in a bracket on the right-hand side of the motor and driven by a transverse shaft which is worm-driven from the crankshaft, the gear casings being plainly shown in the illustration of the uncovered motor. The crankshaft is of the three-bearing type, while the connecting rods, which are long, are fitted at the crank-pin ends with bearings of special steel. A constant level splash lubrication system is employed, the oil being fed from the crankcase, which contains 3½ gallons, by a plunger pump, while an auxiliary supply of 5 gallons is under control of a hand pump.

The radiator at the dash is of the cellular type and air is forced through it and out at the sides by a fan which is incorporated in the flywheel. The heated air is thus blown away from the car and as it is not carried over the motor after passing through the radiator, naturally there is very little tendency for dust and dirt to collect in the motor space, even though there are no working parts exposed. The lower part of the motor space is closed by a horizontal pan at the level of the top of the crankcase, and the tight-fitting hood completes the enclosure. The motor crankcase has a rearward extension which forms a protection for the flywheel and runs back until it overlaps the gearbox.

Transmission of power from the motor to the rear wheels is effected through a multiple disk clutch, three-speed change gear and propeller shaft to the full floating rear axle. The clutch, which is built into the flywheel, has 40 plates of steel, of dished form, running in oil. The gearshafts run on imported annular ball bearings. Speed control is through a lever centrally mounted on the top of the gearbox, the maximum movement of the top of the lever being not more than 3 inches. The propeller shaft runs through a steel torque tube. There is but one universal joint in the propeller

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shaft; as the drive line is straight when the machine is normally loaded, there is very little wear imposed on the bearing surfaces of the joint. A three point suspension system is employed for the gearbox, there being two points of attachment on the left side and one on the right, all being on the side frames.

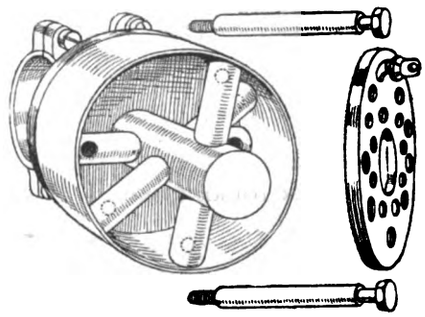
Pressed steel of the usual channel section is employed in the frame, which is narrowed at the front to facilitate short turning, and is raised or "kicked up" 5 inches at the rear. There is no sub-frame, both motor and gearbox being carried direct on the main frame. The front of the car is suspended on semi-elliptic springs 36 inches long and 2 inches wide, while the rear springs are 50 inches long, three-quarter elliptics of the same width; special alloy steel is used for this important part of the chassis. Wheels are of wood, with 10 spokes in front and 12 in the rear, all spokes being 1¾ inches in diameter, and all run on annular ball bearings. The spokes of the rear wheels are bolted to the steel brake drums. Demountable rims are regularly fitted. Both brakes are of the internal expanding type and act on concentric drums; there is no emergency brake lever, both brakes being actuated by pedals. This arrangement has the advantage that it tends to familiarize the driver with the working of the emergency brake as well as the service brake, and also that it distributes wear more equally than is the case where one of the brakes is actuated by a lever and the other by a pedal. On the Keeton car the brake pedals are side by side, the right pedal operating the emergency brake and the left the service brake and at the same time the clutch. Control of the car is further simplified by the absence of a lever for ignition control; the point of ignition being fixed.

All the Keeton bodies are of sheet steel built over wood frames. Six-cylinder chassis are fitted with Riverside and Meadowbrook type touring bodies, as well as roadster and coupe coach-work, while the fours may be had as touring cars, roadsters or coupes. In all cases there is a road clearance of 12¼ inches under the lowest part of the car, notwithstanding which the center of gravity is low.

In the matter of equipment the Keeton cars are well provided for. The standard outfit consists of acetylene motor starter, top with cover, rain-vision windshield, 60-mile speedometer, gas headlights with tank, electric lighter for the headlights operated from the dash, electric side lights, combined oil and electric tail light and license holder, a 6-volt 80-ampere hour storage battery, electric horn, bulb horn, demountable rims and one spare rim, tire irons for carrying two tires, auxiliary oil and gasolene tanks holding 5 gallons each, robe and foot rails, tools, jack, pump and tire tools. In the matter of finish, option is given on three combinations of colors: royal blue body with black moulding and white striping, and French silver gray chassis with blue striping; Brewster green body with white striping and black moulding, and Brewster green chassis with white striping and natural wood wheels; and royal maroon body with ivory white striping and black moulding, and Mercedes red chassis with black striping.

"Silent Cut-out" Makes its Appearance.

Whether or not the muffler cut-out may serve a useful purpose in permitting the realization of a small amount of extra power from an otherwise closely muffled engine, the use of such a device has been tabooed in many of the larger cities abroad and its days in New York City and other American cities are numbered. As an echo of the order which "killed" the mufflier cut-out in London, and in order that those who still incline to the use of the device



"SILENT" CUT-OUT DISSECTED

may follow the dictates of their fancy without danger of falling foul of the law, there has been brought out what is styled a "silent cut-out," the device in its entirety being illustrated herewith. In its simplest aspect it is merely a miniature mufflier that is designed to be clamped on in place of, or directly over, the usual cut-out and it is calculated to reduce the raucous tones of a free exhaust to a whisper so gentle that ordinary ears, and particularly the ears of the police, will not be offended. It is said that the device permits as free an exhaust as the plain "hole in the pipe" cut-out but without the usual cannonading, a claim which the construction of the device would appear to substantiate. To apply the "silent cut-out" it is merely necessary to chip a hole in the exhaust pipe and clamp it in place. The exhaust gases escape first into the larger central tube, which is but a few inches in length, from whence they are led into the casing through the smaller projecting tubes. The smaller tubes are open at their outer ends and terminate close to the casing, exhaust being facilitated by the provision of additional holes in their sides. The cover of the miniature mufflier is perforated to permit the escape of the gases and the whole device weighs scarcely more than a couple of pounds.

Protecting Horns from Short Circuits.

Unless electric signal horns are carefully wired, they may evince a tendency to emit raucous sounds when least expected and without the slightest provocation. It is disconcerting, for instance, to have a horn "start something" in the dead of night in an otherwise quiet garage. Incidentally, it causes a waste of current, even if the owner is disposed to turn a deaf ear to its pleadings. The reason for such disturbances is perfectly evident—a short circuit. The rumbling of some other vehicle over the roads in the immediate vicinity may cause sufficient vibration to bring into contact wires which really should be well insulated from each other. One way to obviate such troubles is to make doubly sure that wires that ought to be insulated really are insulated. Another way, and one which is being adopted by a number of the better known manufacturers, is to enclose the wires in a neat brass tube so that they cannot vibrate either on the road or in the garage. Thus the unsightly wires are gotten out of the way and neither water nor vibration can cause them to short circuit. It is essential, of course, that the insulation on the wires be perfect before they are drawn into the tube or the remedy may be worse than the disease.

Effect of "Gearing Up" on Magneto.

As the intensity of the spark that is generated by a magneto is governed to a certain extent by the speed of the armature, it should be remembered that "gearing up" a car means that the number of turns the crankshaft of the engine makes to one turn of the rear wheels is reduced and as the magneto is connected positively to the engine its armature speed and consequently the intensity of the sparks it generates is reduced. Obviously, it is impossible to alter the relative speed of the magneto for it must generate is sparks in accordance with the position of the pistons. Generally it is possible to make up the deficiency by reducing the length of the spark plug gaps though the method may not always prove efficacious.

Pushing Car Often Does Damage.

While the radiator cap and the mudguards of a car are sometimes most convenient for hand-holds when pushing the machine around by hand, they were not designed for any such purpose, and many a "started" cap and bent mud-guard can be traced directly to the energetic push of a heavy man. Some cars will stand such things, but the only safe way is to take no chances and pusht on something that cannot be damaged.

Retarding Spark for Engine Starters.

No matter what class of engine starter may be employed, as much care should be exercised to retard the spark before the motor is started as would be used were the motor to be turned by hand. The sense of security which is the direct outcome of the abandonment of the crank as a starting device, leads to carelessness on this score, and as a consequence the motor receives more than its share of jars and jolts when being started.

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MUFFLERS AND THEIR EFFECT ON ENGINE EFFICIENCY

The Reason for the Noise That Is Caused by the Exhaust and the Necessity for Providing Means of Gradually Cooling and Expanding the Useless Products of Combustion Before They Reach the Outer Air—How Present Practice Meets Requirements.

Nearly everyone who knows anything at all about automobiles knows what a muffler is and what it is for; its very designation answers that much. Abroad, where terminalogy as an art often takes twists that are peculiar, "silencer" is the descriptive word that most frequently is used. But inasmuch as "silencer" implies something that makes something else silent and as silence is absolute, the term plainly is a misnomer. Engines that do not emit at least a muffled hissing from the exhaust, regardless of the efficiency of the "silencer" are few and far between. But the hissing, as such, is not objectionable and mistermed "silencer" or muffler is the same thing in the attainment of its end, which is to render less obnoxious the staccato notes of a free exhaust. At present mufflers and their design are of more importance than has been the case. Everywhere there is an outcry against the "cut-out" and so many laws are piling up forbidding its use, that "any old muffler" no longer will serve. With the "cut-out" eliminated, an efficient muffler, one that really muffles and without affecting the power of the engine has been necessary and must be employed, else reputations will suffer or the income of the police courts be greatly enlarged.

As to why a muffler should be necessary at all, there scarcely is required a very great amount of reflection. On the Fourth of July, in the lands that are presided over by the Chief Executive of the United States, there are few small boys who do not materialize sundry cannons from unsuspected hiding places and after having put into their interiors a generous charge of gunpowder—usually a too-generous charge, if the records of accidents are to be relied on—which is carefully tamped down with moistened newspaper, ignite a fuse and retiring to a distance that may or may not be discreet wait expectantly for the not inevitable "bang."

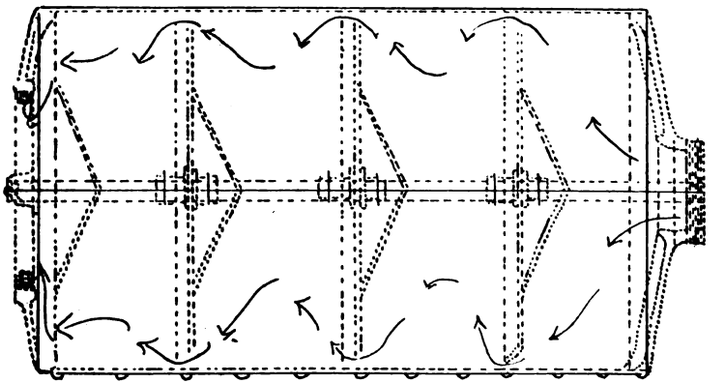
When the "bang" occurs, it is caused by certain chemical changes which take place in the gunpowder. The boy does not care what the changes are and neither does anybody else as a rule, so long as the sought-after noise is produced, but by way of making plain the phenomenon it may not be irrelevant to delve a little way into physics.

When the gunpowder is placed in the cannon it occupies a certain bulk and as long as no outside influences act upon it its bulk will remain unaltered indefinitely. But immediately the powder is ignited through the common medium of a fuse an instant and startling change takes place. The powder is instantly (for example) converted into gas and a certain small amount of residue which may be neglected as of little importance. The gas that is generated is in volume many times greater than the original volume of the powder and consequently is very greatly compressed. It exerts an equal pressure on all sides of the confining body and as the path of least resistance lies along the barrel of the gun, which is choked by the aforementioned wadding, the wadding is expelled and the confined gases issue into the atmosphere.

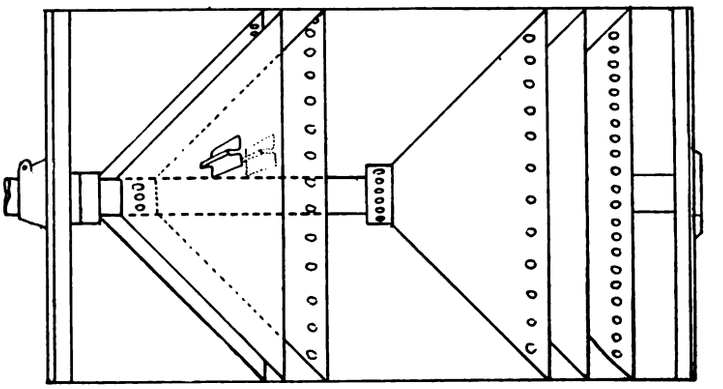
But as the gases are very greatly compressed, they quite naturally expand when the confining influence is removed. And in expanding they disturb the surrounding atmosphere. For instance, it is as if a stream of water under considerable pressure were directed into a receptacle containing water in a state of quiescence. The noise made by the stream of water impinging on the water in the receptacle is as the "bang" of the gun when the wadding is expelled and the gases are permitted to expand suddenly to atmospheric pressure.

Without going deeply into the matter, practically the same thing happens within the cylinders of an internal combustion engine (hence the designation "internal combustion" engine) as happens inside a cannon when the powder is exploded. The explosive agent in the gun is a solid, of course, whereas the explosive agent in the engine cylinders is atomized gasoline mixed with the proper proportion of air. Internal combustion engines have been made to operate on gun-powder, which is fairly well known, but that is beside the issue—anyway, the engines never were a success and the idea quickly was abandoned.

After a charge of mixture is drawn into the cylinder of an engine it is compressed. It then occupies a smaller space than it ever has occupied before and certainly smaller than it ever will occupy again. Then, immediately the piston starts its downward travel on the working stroke the ignition spark ignites the mixture. The result is the same as when the powder in a gun is ignited except that the products of combustion are slightly different. The mixture immediately is tremendously increased in volume and as it is confined (assuming any instant when the piston is stationary) its pressure is proportionately increased. It is needless to add that it is the pressure that causes the piston to travel downward and thus perform useful work. After the working stroke is complete the exhaust valve opens and the highly compressed gases are permitted to escape from the cylinder. Here, too, the similarity between the operations in the cylinder and in

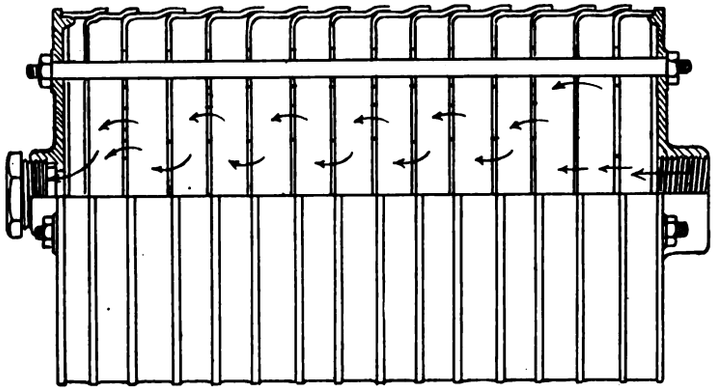


LOZIER BAFFLE CONSTRUCTION

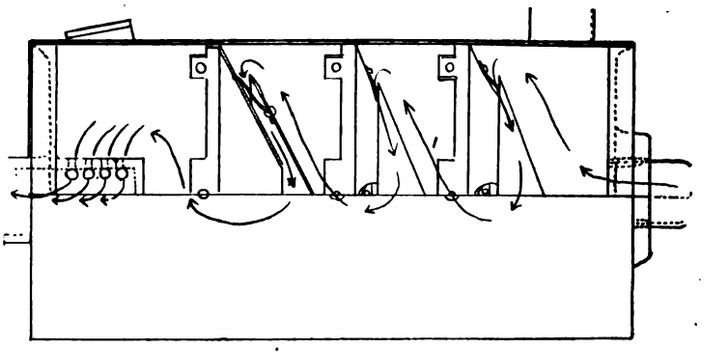


MATHESON "EJECTOR" MUFFLER

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POWELL BUILT UP CUPS



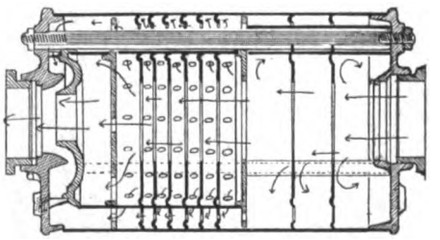
KNOX PAIRED CONES

the gun barrel obtains. It is the rapid expansion of the gases to atmospheric pressure that causes the disturbance which has resulted in the legislation against the muffler cut-out.

It is the duty of the muffler to govern the rate of expansion of the liberated products of combustion. If, in the example of the stream of water impinging on a body of water in a state of rest, the pressure on the stream is reduced, the noise of impact also will be reduced for there will be less disturbance. Similarly, if the exhaust gases from an internal combustion engine are caused to expand slowly before they finally reach the atmosphere less disturbance and consequently less noise is the result.

A good muffler is one which causes gradual expansion of the gases so that they issue at practically atmospheric pressure. While it is comparatively easy to attain this result by using a small expansion chamber with a very small outlet, such as a number of very fine holes, the result would be the same as if a chimney was partially plugged up in order to reduce the emission of smoke: the engine would be choked. One of the commonest tricks played on a green chauffeur is to plug the exhaust pipe of his car with cotton waste and then watch him hunt for the trouble. The engine will run for a time, or until the pressure in the exhaust pipes and the muffler becomes great enough to hinder the expulsion of the freshly burned charges, and then it will "die." Of course, there is danger of blowing up the muffler but that matters little to the practical joker.

Consequently, it is essential that the second consideration of a good muffler shall be that as little obstruction to the free exhaust of the burned charges as is possible shall obtain. A small muffler, that is, one that is too small for the engine, or one that is inefficient will have the same effect as when the exhaust pipe is partially clogged. Considerable "back pressure" will result and the efficiency of the engine will be impaired. Some manufacturers desire a certain amount of back pressure. A check-valve is inserted in the exhaust manifold and the pressure is utilized to force the

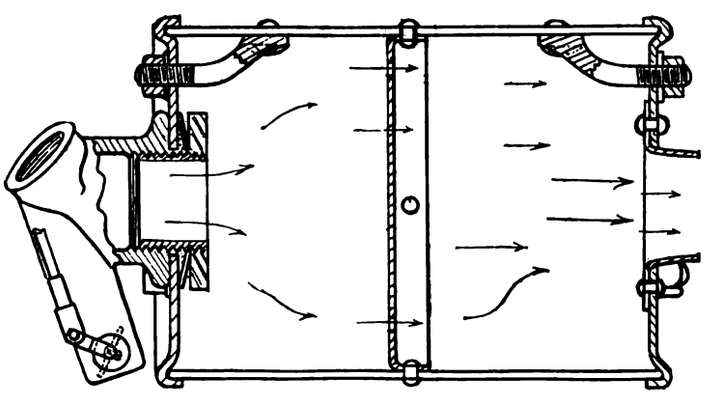


XARGIL CONSTRUCTION

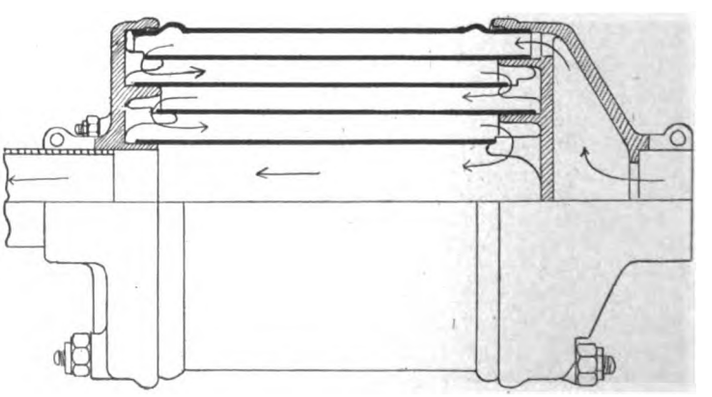
fuel to the carburetter when its flow by gravity is either impossible by reason of the location of the gasolene tank or is too sluggish. Still, a great many manufacturers have found that the better way is to provide a muffler that causes as little back pressure as possible and to rely for pressure for the fuel tank on a small auxiliary pump run by the engine.

The third consideration of the perfect muffler is that it shall operate for indefinite periods without clogging. The burning of the explosive mixture causes a certain amount of soot, the amount being governed by the richness of the mixture, the amount of cylinder oil burned and the amount of dust sucked into the cylinders through the carburetter. This soot popularly is styled carbon, though the amount of real carbon is very small. As the burned gases that are expelled contain a certain amount of moisture as well as the soot and as the moisture condenses immediately it comes in contact with the cold metal of the muffler, the soot is deposited and sticks to the insides of the muffler. If the passages are small and are easily clogged the ultimate result is the same as it would be if a clean muffler a couple of sizes too small for the engine were used.

Incidentally, it does no good to fit a tremendous muffler and then feed it with pipes that are almost infinitesimally small. There are several makes of car of excellent reputations on the market today that are silent and they seem to the casual observer to be efficient. But an examination of the tiny exhaust passages that are used scarcely can lead to any other conclusion but that the designer was sadly remiss when he consented to use such small pipes. On one of these cars a wonderful difference in the pulling power of the engine was made by simply substituting a larger exhaust manifold and pipes for those that were supplied with the car and retaining the original muffler. The car was just as silent as it ever was and it went up hills on "high" that previously had required the use of intermediate gears.



REO EXPANSION CHAMBER



CADILLAC CONCENTRIC TUBES

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As incongruous as it may seem, instead of causing back pressure a good muffler actually may cause an increase in power at certain engine speeds. It is a condition that few laymen understand or know anything about and the explanation is to be found in the inertia of the gases. Gas, like any other substance, has a specific weight, and when it is in rapid motion it has a certain inertia. The effect of the inertia is to cause a partial vaccum behind the column of gas. This vaccum assists in drawing out the charge of burned gases from the next cylinder and for this reason the efficiency of the engine is increased. Several manufacturers take advantage of this feature and increase its value by forming the exhaust manifold in such a way that the velocity of the gases after issuance from the cylinders is increased, which in turn increases the partial vaccum caused by their passage. It is to be assumed, of course, that the gases do not issue in a constant stream, but that the stream is intermittent, the gases from one cylinder issuing in a puff, so to speak, and causing a partial vacuum in their wake that assists in scavenging the next cylinder to exhaust.

Obviously, the inertia of the gases is governed by their speed and their speed is governed in turn first by the initial pressure of their release and second by the friction which results from their passage through the exhaust pipes. In other words, all things being equal, the inertia of the gases in a perfectly straight pipe will be greater than the inertia of the gases in a pipe which has many bends. Consequently it is essential that the pipes leading to the muffler be as free from bends as is possible. In place of one 90-degree bend it is better practice to use two 45-degree bends for then the change in direction of the rapidly flowing gases will be less abrupt and there will be less friction. Even neglecting the theory of the inertia of the gases assisting in freeing the pipes of the products of combustion, it is best that there be as few bends as possible for the rate of flow through a straight pipe, other things being equal, always will be greater than the rate of flow through a bent pipe and the useless gases must be gotten rid of in the shortest possible space of time for best efficiency.

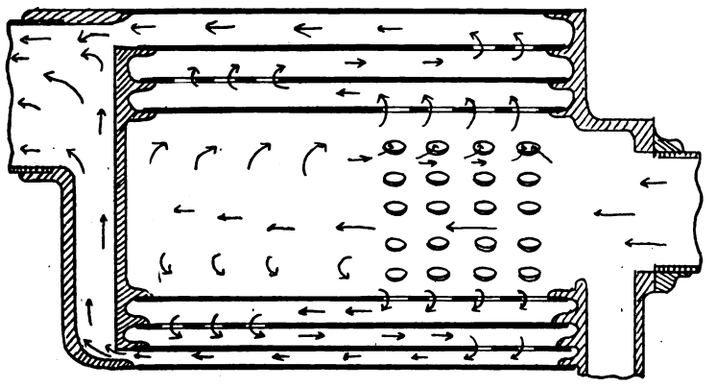
Of the making of books, it has been said, there is no end and the same thing might be said of a great many other things; mufflers are no exception to the rule. The simplest form of muffler known and the one that was used first and is used in a few instances today, is the plain expansion chamber. It is perfectly innocent of any "insides" whatsoever and consequently cannot clog. Very few automobile manufacturers use such a muffler, however, the most conspicuous being the American Locomotive Co. The next obvious variation from the ideal of simplicity as exemplified in the plain expansion chamber is to place one or more perforated or unperforated baffle plates in the path of the gases, and, thus breaking them up, cause them to expand and cool slowly. The Reo muffler, illustrated herewith, contains but a single baffle plate which is perforated. In order to make plain the operation of the several mufflers which are illustrated, the drawings in each case are slightly distorted the proportion of length to diameter generally being considerably greater than it is depicted.

The Powell, which is used on a large number of well-known cars and trucks, is one of the simplest of those in which reliance is placed upon a series of baffle plates. Each baffle plate is merely a cup-shaped receptacle which fits into the next one, any number of cups being used according to the size of the engine for which the muffler is intended. The alternate cups are perforated and the others have a large circular hole in their centers. As the total opening area in each baffle plate is greater than the area of the exhaust pipe of the engine there can be little if any back pressure.

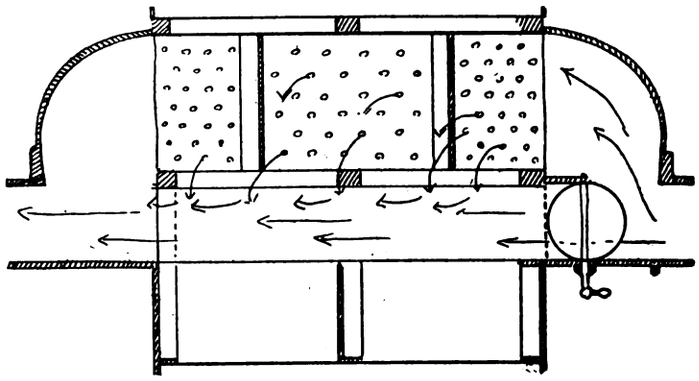
In the Lozier muffler practically the same principle is relied upon. The plates in this case, however, are perfectly plain, very slightly cup-shaped and are without perforations, the gases impinging against them and escaping around the edges and the outer casing. Indicating that the amount of back pressure caused is extremely small, it was found necessary to use an auxiliary air pump for placing pressure on the fuel tank. The Knox muffler is another in which coned baffle plates are used, and though the plates are not perforated the system of operation is quite different from that which obtains in the others. Each cone is in effect a double cone (only half the muffler is shown in section) and the gases circulate between the pairs of cones and issue into a large expansion chamber at the end whence they reach the outer air. Except in the case of the muffler used on Matheson cars—it is made for the Matheson company and others by the Motor & Mfg. Co., Geneva, N. Y.—these are about the only variations in which baffle plates of one kind or another are used. Though the baffle plates in the Matheson muffler serve the purpose implied by their designation their shape and position is such that they serve another and very important end. The muffler is built around the ejector principle. Which is to say that each cylinder exhaust is caused to form a partial vaccum in its wake that assists in withdrawing the next exhaust. Incidentally the first exhaust is assisted on its way to the outer air by the push from the second, expansion and cooling having taken place during the passage of the gases.

In the Xargil muffler, which is in use in a considerable number of well-known cars, prominent among which are the Franklin and the Chalmers, a principle is involved that is quite different from any of the others that have been described. The forward part of the muffler is divided into three compartments or expansion chambers which serve to lower the high velocity of the gas. The remainder of the muffler is occupied by disks placed somewhat closer together and has a vacuum compartment concentric with the muffler. This vacuum compartment is maintained under vacuum by a large aspirator chamber at the outlet end of the muffler. As the gas passes through the large openings into the center of the disks it naturally expands somewhat between them, but is further robbed of its pressure and volume by the continual suction that the vacuum chamber maintains. All the force or pressure of the column of gas is utilized in creating a vacuum in the compartment at the end of the muffler and as there are no small passages and the speed of the gases is not impeded there is but very little chance for clogging.

The muffler that is used on Overland cars



OVERLAND PERFORATED CASINGS



WOLSELEY'S "SILENT" CUT-OUT

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is composed of three tubes and a casing which fit into the cast heads. The inner tube is perforated at the end at which the gas enters, the second tube at the other end and the third tube at the same end as the first. As may be seen by the direction of the arrows in the accompanying sectional view the exhaust gas enters the inner tube, expands and cools, rushes out through the perforations into the next compartment where the expansion and cooling are continued, then into the outer tube and out of the muffler. The combined opening area is greater than the area of the exhaust pipe thus reducing to the minimum the chance of back pressure. The Cadillac muffler operates on a very similar principle, the difference being that none of the concentric tubes are perforated and the gas enters first into the largest tube which presents the greatest cooling area and the greatest space for expansion. From the outside tube the gas follows the course indicated by the arrows.

Foreign practice differs but little from that which has been outlined though as might be expected there are several variances that are unique to say the least. The Wolseley Tool & Motor Co., which manufactures and markets the Wolseley cars, for instance, just has adopted a new type of muffler that is unusual. Incidentally, its adoption is concrete evidence that Britishers feel deeply the necessity for a cut-out of some sort or other and it is to satisfy this hankering that the New Wolseley muffler has been brought out. It is styled a "silent cut-out" muffler, the reason for the appellation being apparent from the accompanying sectional drawing. When the cut-out is open, the gases pass straight through the muffler as indicated by the arrows. When the cut-out is closed however, the exhaust gases first circulate around among a number of concentric perforated expansion chambers whence they escape by the straight-through passage.

For the Man Who Smokes Cigars.

The idea of discouraging the production of sparks on a motor car does not sound exactly orthodox, but it is just what the Nospark Co., of Oshkosh, Wis., has gone into business to do. The purpose of its device, however, is to subdue the unruly cigar spark, which is a source of no little discomfort and annoyance in the rush of air caused by the rapid motion of a car. The "Nospark" is a small aluminum screen cap that fits over the active end of a cigar and prevents the ashes and sparks from being whisked away by the wind. Ventilating holes provide for plenty of air on all sides.

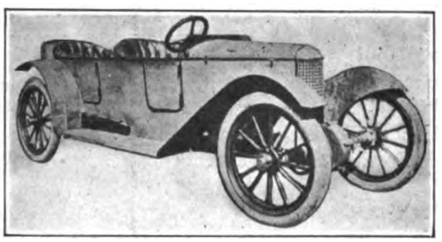
To Teach Motor Engineering in Pittsburgh.

The importance of automobile engineering has made itself felt in Pittsburgh, Pa., and as soon as Machinery Hall at the Carnegie Technical Schools is completed, a course in this work will be underatken. The new course will be under the dean of the School of Applied Design.

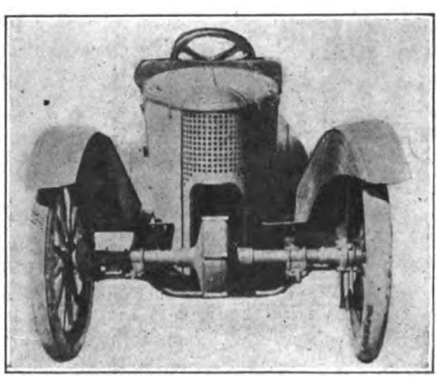
DETROIT GIVES BIRTH TO "DODO"

It Is of French Extraction but American Adapters Radically Alter Its Make-up—Lightweight at Low Price.

While there has been no little adverse comment abroad regarding the "invasion" by American small cars of foreign markets, it is so seldom that a foreign small car "invades" in return, that when such a thing happens it is almost in the nature of an event. But if the putting forth of the little car shown in the accompanying illustrations is considered in the light of a diminutive "invasion," then it must be granted that the attack is an extremely mild one, for the Autoparts Manufacturing Co., of Detroit, which is responsible far the car, has so altered the design of the French "Bedelia," that served as a foundation, as to leave little of the original except the tandem seating arrangement and a general reminiscent appearance. The car has been christened "Dodo." So far only the one photographed has been constructed, but preparations are being made to manufacture Dodos in quantities.



THE DODO, SHOWING TANDEM SEATS



FRONT VIEW, SHOWING DRIVE

The most important change in the design consists in concentrating the entire driving plant, including the driving wheels and intermediate mechanism, at the front, thus making the machine a front-drive car and eliminating the somewhat crude system, originally used abroad, of rear drive through belts which were slipped and allowed to run loose in lieu of a clutch. The air-cooled motor is rated at 10-12 horsepower and has two vertical cylinders; its position at the extreme front end facilitates air cooling, the opening in the front of the hood admitting an ample supply of air for the purpose. As the rear wheels are relieved of driving duty, they run on an axle that is a simple straight steel tube. There is no frame, as the term usually is understood in motor car design; the body itself is so constructed as to make a separate frame unnecessary. In fact, the concentration of the power and transmission mechanism at the forward end makes the body and rear wheels a sort of trailer, which has nothing to do but carry the passengers and be pulled along by the front wheels. As in the original Bedelia, the passengers sit tandem, this arrangement facilitating light construction. The regular tread will be 56 inches and the wheelbase 100 inches. It is proposed to build a narrow-tread model for European trade, with a distance of 50 inches between the wheels. The wheels are 28 inches in diameter. Tires are 3-inch.

In addition to the touring body shown in the illustrations, the Dodo will be built with parcels delivery body, and, possibly, with a diminutive coupe body, if it is found that the wind resistance is not too great.

Rare Cause of Compression Loss.

Loss of power, occasioned by loss of compresion has been charged to a variety of causes, probably the most prolific being the gumming or sticking of the piston rings. Another cause of loss of compression which is rare, though it may not be as rare as generally is supposed, recently was discovered by an harassed owner and his experience may serve others to advantage. "The piston rings in my engine," he says, "are supposed to be prevented from turning by small pins screwed into the pistons and projecting into slots in the rings. The holes in the piston castings are drilled through the whole thickness of the piston wall and one of these pins under the top ring had come adrift and disappeared so that the gases from the cylinder head passed right through the hole into the crankcase. Examination of the remaining rings revealed that a pin had disappeared from each but the rings had turned so that the holes were covered." "It is possible," he adds, in discusing a crankcase explosion that all but wrecked his engine, "that the cause of the accident may have been somewhat similar."

How General Electric Carries Patents.

Although since its organization the General Electric Co. has expended more than $20,000,000 in the purchase of patents and in defending them, its balance sheet shows that since the close of the 1906-7 year the patents have been carried at a nominal value of $1, which in these days when patents and goodwill usually are carried at enormous sums, is such a radical state of affairs as to call for general remark. Since extinguishing its patent account five years ago, however, the General Electric Co. has charged $4,039,600 to earnings to represent the cost of acquiring new patents and patent litigation.

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STARTS COLD MOTOR ON KEROSENE

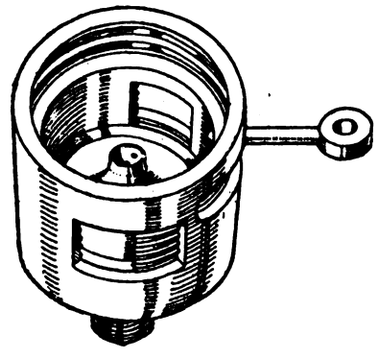
Or So the Inventor Claims—Tiny Vaporizer of Unusual Simplicity Creates a Furore Abroad—Its Features.

Coincident with the coal strike abroad, which has been the cause of much activity in the ranks of those who seek to perfect a device which shall permit the utilization of the heavier liquid fuels without the necessity for complicated apparatus, the already large market has been further added to within the past few weeks by an unprecedented number of so-called paraffin carburetters. The situation in itself is worthy of comment if for no other reason that not a few of the recently developed devices actually substantiate the claims that are made for them and those that do not approximate them so closely as to lead to optimistic expectations for the birth of the real kerosene carburetter—a carburetter that will not only permit keresone to be used without preheating either the air or the fuel, but which will permit an engine to be started "from the cold," without failure, on the heavier and cheaper fuel, such as distillate.

By far the simplest of all the devices of such nature and the one for which by far the most sweeping claims for superiority over everything of its kind are made is the Durr vaporizer which just has made its foreign debut under the auspices of C. P. Wenzell, 123 Pall Mall, London, S. W., who has acquired the exclusive rights for Great Britain. It is the invention of Fitz Durr, Frankfurt-on-Main, Germany. It is doubtful if a smaller carburetter with larger claims ever has been offered the public. Its simplicity may be judged from the accompanying illustrations and despite its exceptionally small size—over all it measures but 2¾ inches in height by a little over two inches in diameter—it is claimed that by its use an engine may be started cold on kerosene and kept running at approximately half what the cost would be if gasolene were used; incidentally, the power output is increased.

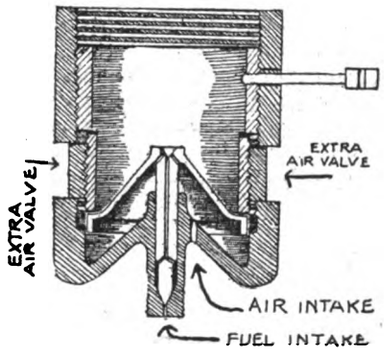
By way of attesting the facility with which the unique device handles kerosene the records of a number of tests which were made at the Darmstadt Technical Institute are quoted and if reliance is to be placed on them the performance of the carburetter leaves little to be desired. During a test of five weeks' duration, a 10-horse power stationary engine consumed 6.06 ounces of crude benzol, which is very much akin to kerosene, per brake horsepower hour. Comparative tests on a four-cylinder 50-horsepower automobile engine revealed that with gasolene 62 brake horsepower was developed on a consumption of 9.87 ounces per brake horsepower hour. Using kerosene and the Durr carburetter, the same engine, under similar conditions developed 71.9 horsepower and the fuel consumption fell off to 7.85 ounces per horsepower hour.

The Durr carburetter consists of but three parts and one of these remains perfectly stationary at all times. It has no float nor float chamber, no springs and no auxiliary heating apparatus such as might legitimately find a place on the usual kerosene carburetter. The outer sleeve (referring to the accompanying illustrations) is internally threaded and into it there fits an inner sleeve which is externally threaded and movable.



DURR VAPORIZER

In operation, the fuel is fed in at the fuel intake under pressure though immediately it enters the carburetter its flow is regulated by the vacuum in the intake pipe. Suction in the intake pipe causes the needle valve to open and because the air intake passages are very small the air enters at high velocity it effectually atomizes the fuel.



DURR VAPORIZER IN SECTION

Simply rotating the inner sleeve, which is in effect the throttle, permits the fuel control valve to open wider and at the same time uncovers two auxiliary air valves in the sides of the outer sleeve. As the fuel and air which enter by the usual channels already are thoroughly mixed by reason of the high velocity of the inrushing air, admixture with the auxiliary air is comparatively simple and is said to be so complete that recondensation and consequent "loading up," which is a fault inherent to very nearly all other kerosene carburetters, is slow and is unlikely to occur under ordinary running conditions unless the engine is operated at inordinately low speeds for long periods.

JACK THAT BOTH LIFTS AND WEIGHS

Hydraulic Principle in New German Device—It is Minus "Pump-Handle," Springs and Valves, However.

By way of conserving the highways, the police authorities in England have promulgated laws which limit the total weight of any motor propelled vehicle and its load to 12 tons. Further, in view of the usual practice to center the greater portion over the driving wheels, it is required that the net weight on any axle shall not exceed 8 tons. It is to facilitate the determination of the weight carried on each axle of a vehicle, in order that it may be kept within the bounds prescribed by law, as much as to provide a device capable of lifting such weights with comparative ease that has prompted the Western Iron Works, which is a British manufacturing concern with headquarters in Lancaster, to bring out what has been styled the "Easyweigh" jack.

It is a comparatively simple matter, of course, to jack up one wheel of a pleasure car, or to raise one wheel of an unladen commercial vehicle. But when that vehicle is laden with anywhere from 5 to 12 tons, and when it is remembered that the axle weight legally may rise to 8 tons, it is quite another proposition. In order to make possible the raising of the maximum loads with the minimum expenditure of energy, the manufacturers have elected to utilize hydraulics, but though the usual hydraulic jack is more than ordinarily complicated, the "Easyweigh" jack is beautifully simple, not only in the matter of design and construction, but also in the method of putting it into operation and obtaining the exact weight of the vehicle.

There are no valves in the jack, the lifting medium which is heavy oil being forced into the space below the lifting piston by means of a screw. A long handle is furnished and connected with one end of the screw, suitable reduction gearing being interposed.

Turning the operating screw simply forces the oil out of one reservoir into another below the lifting piston. Thus the usual pump handle, which is an inevitable part of other hydraulic jacks is eliminated. The weighing portion of the jack is simply a heavy spring balance. Readings of the weight supported by the jack are made directly from a circular dial which forms part of the device.

To Protect Spare Valves from Injury.

The best way to carry spare valves is to slip the stems through a block of wood of slightly greater diameter than the head of the valve. The spring and washer will keep the block from working off, and no amount of rattling in the tool kit will injure the head of the valve so protected.

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Tax Assessor and Second-Hand Car.

What a second-hand automobile is worth, is and probably always will be a point of contention between those want to sell and those who are in the market for such a vehicle. Owners generally value their used cars more highly than do others, but this order of affairs was reversed the other day in Kansas City, Kan., when City Assessor A. H. Gillis undertook to assess a car belonging to Dr. S. S. Glasscock. The physician, according to custom, drove his car to the assessor's office and the assessor's specialist went out to look it over. In answer to various questions Dr. Glasscock said:

"I've had it four years, it is a four-passenger car and it cost me $2,500."

"It should be assessed at about $800," the assistant answered.

"Great Scott, man, you're joking," Dr. Glasscock exclaimed. "Why, I'll sell that car for $200."

"I'll call that bluff," said Gillis, who was an interested listener. But Dr. Glasscock was not bluffed and motioned Gillis into the car and drove to a bank. Gillis returned with the car, but he has not announced what the assessment will be.

Woman Race Spectator Gets Big Verdict.

As an echo of one of the 24-hour races held two years ago at the seaside track at Brighton Beach in Brooklyn, N. Y., a jury in the New York Supreme Court for the County of New York this week awarded Mrs. Ella Everts the sum of $10,000 damages in a suit against the Brighton Beach Racing Association and the Motor Racing Association. Strange to relate, Mrs. Everts is neither kith nor kin to any of the race drivers, nor had the accident which prompted her to sue for damages anything directly to do with the racing itself; it was one of the most peculiar that has been laid to the door of racing in some time. Mrs. Everts claimed that in attempting to leave the grandstand at 1 o'clock in the morning, the lights having been extinguished at midnight, she mistook the next to the bottom step for the bottom step and fell, breaking her ankle. She has been incapacitated ever since and a jury gave her $10,000 worth of the balm for which she sued. But whether she can collect any part of the sum is an open question, as neither of the defendant associations are known to possess tangible assets.

Automobile Fender That Saved a Boy.

Automobile fenders, although designed to furnish a measure of protection for the forward end of the car, are capable of other service, as was demonstrated last week in The Bronx, New York City. But for a sturdy fender at the front end of a big touring car, five-year-old Freddie Dralle might not have survived to tell of the advantages of the bumper. The boy was playing in the street when the car approached, and in the collision which resulted was somewhat dazed, but as he fell before the machine he unconsciously grasped the fender. The driver was under the impression the boy had been brushed aside, and drove on. The lad's father, having seen the accident, rushed into the street to pick up the lad and was amazed when the boy could not be found. After driving several blocks, the driver had his attention attracted to the boy, whom he was dragging, and the car was stopped. Freddie was uninjured.

New Clubs and Club Elections.

The McLean Automobile Club, Bloomington, Ill., has elected officers as follows: President, George Freese; vice-president, G. H. Johnson; secretary and treasurer, W. L. Martin.

Pratt County, which is in Kansas, now has an automobile club of which C. A. Hooper is the president. The other officers are vice-president, A. S. Fay; secretary-treasurer, James G. Blaine.

The New Ulm Automobile Club has been organized in the Minnesota town of that name. Its officers are: president, Emil G. Hage; vice-president, J. H. Siegel; secretary-treasurer, A. Schiller.

The Moorhead Automobile Club has been formed in Fargo (N. D.) The officers chosen for the first year are: President, Charles S. Marden; vice-president, A. M. Hopeman; secretary, George L. Walker; treasurer, Pierce Wolfe.

Robert P. Hooper, president of the American Automobile Association and head of the Pennsylvania Motor Federation, has been elected a member of the Board of Directors of the Automobile Club of Philadelphia. Mr. Hooper succeeds George B. Linnerd, who resigned.

At a meeting which resulted in the organization of the Bozeman (Mont.) Automobile Association, the following were elected to office: President, H. L. Casey; vice-president, A. L. Love; secretary and treasurer, Charles E. Dunlop. The board of directors comprises: J. H. Dawes, C. P. Manry, T. S. Kirk, W. S. Erwin.

Robertson S. Ward has been elected president of the New Jersey Automobile and Motor Club, of Newark. The other officers are: vice-president, David Oaks; secretary, A. B. Lemarsena; treasurer, Herman B. Good. Board of trustees consists of Ira A. Kipp, Jr., Richard C. Jenkinson and George Blakeslee.

Detroit Club to Build a Mansion.

The "Automobile Capital" of America shortly will possess an automobile clubhouse befitting its reputation. It will be erected for the Wolverton Automobile Club—in Detroit, of course—and, it is stated, will probably surpass anything of its kind in this country at least. The building, which will be an eight-story structure, will be upreared at the corner of Madison avenue and John R. Street; it will be topped by a roof garden and will be the "last word."

The Lady and the Squirrel.

Legitimate reasons for automobile accidents are apparently as numerous as the excuses for speeding and each day adds a new one to the list—in both cases. Miss Laura Phillips of Litchfield, Conn., probably holds the honor of the most unique cause of accident so far. A squirrel—not a mouse—did the trick. Miss Phillips was driving a touring car through Uniontown, N. J., one day last week, when a squirrel fell from a tree and landed on her shoulder. Like a real feminine woman Miss Phillips let go of the wheel to brush off the squirrel. Rumor has it also that she screamed a little. Arthur Adams, who was riding with her, tried to get the brake lever but before he could reach it the car was up against a tree and so badly wrecked that it was out of commission.

Motor Car That Refused to Kill.

Automobiles have often—and especially in the early days of their manufacture—proved a source of disappointment, but generally to the man who drove them. Henry Stewart, a Plattsburgh, N. Y., bricklayer, however, encountered an automobile disappointment of a different sort. Stewart was weary of life and his fruitless search for work and when he saw James Walsh driving in his car near Dobbs Ferry, N. Y., Stewart jumped in front of the automobile in an attempt to commit suicide. He was chagrined when he found the extent of his injuries was two fractured ribs and the owner of the car still further added to the bricklayer's unhappiness by rushing him to a physician's office in the car for treatment.

Claim Spite Killed Philadelphia Race.

According to officials of the Quaker City Motor Club, a "personal spite" directed the movements of Dr. J. William White in his successful campaign to put a halt to automobile racing on the Fairmount Park Course. Isaac Shoemaker, vice-president of the organization, and Clarence Cramer, its secretary, charge that the action taken by Dr. Smith was "to get even because he was denied the right to place an advertising car on the track during the race last year." The charges are characterized as "ridiculous" by the doctor who, however, refuses to deny that permission was denied him to advertise a football game during the race last year.

Chicago Sets a Record for Funerals.

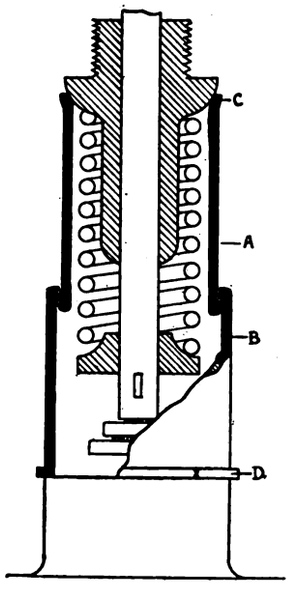
Slow steps have always been the custom at funerals and minimum speed for funeral vehicles also has been the rule, the only exception worthy of mention being—until a few days ago—a western incident cited in fiction by Owen Wister. Chicago, however, had within its confines a funeral the other day, and three carloads of mourners were arrested and haled into Police Court for racing at 34 miles an hour in Madison street.

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MUFFLING VALVES OF OLD ENGINES

Simple and Easily Applied Contrivance That Makes It Possible—Two Iron Sleeves That Make for Quietness.

In the effort to attain silence, the practice of so constructing the valve mechanism that noise is rendered practically impossible, or of providing covers for the mechanism which prevent "clanks" which may be produced from escaping and offending the ears, has become so general that it may be said that, with few exceptions, it is only the cars of earlier models which are not provided with some means of eliminating the noise of the tappets. And abroad, even the cars of earlier vintage now can be made up to date in this respect, that is, if they be of British manufacture, by the application of a comparatively simple device which recently has been placed on the market, in several different models, by H. Lindblom, of Liverpool.

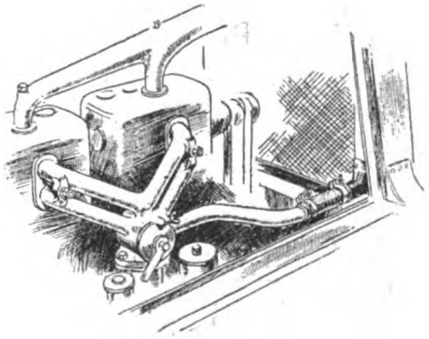


SLEEVE TAPPET MUFFLER

The contrivance, as shown in the picture, consists of nothing more complicated than two iron sleeves, of such relative diameters that one will slip within the other. The upper sleeve (A), which slips into the lower one, is provided with an external thread cut on the lower extremity, which engages with an internal thread which is cut on the upper extremity of the lower sleeve (B). The top of the sleeve A is slightly flared at C, so that the inner circumference will make a tight fit over the surface of the valve stem guide. Sleeve B is provided with a hexagonal nut (D) which serves to provide a wrench hold. The application of the sleeves to the motor is not accompanied by any very great difficulties, it suffices simply to slip sleeve A into sleeve B, and slip the pair under the valve stem, which is held up by means of a valve lifting tool, so that there is sufficient room between the stem and the valve tappet to render the operation possible. If sufficient room cannot be obtained in this manner, the valve needs must be removed, to be replaced after the sleeves are slipped into place. The sleeves are then extended and secured firmly over the valve stem guide and the tappet guide by turning the nut (D) while the upper cylinder is held. Adjustments to the valve mechanism can very readily be made by slipping the sleeve B over the sleeve A, when the mechanism is sufficiently exposed to be reached and adjusted.

Manifold That Affords Simplicity.

Perspicacity scarcely is required to discover that simplicity and accessibility as applied to motor cars, or in fact to almost any piece of machinery, go practically hand in hand. Greater simplicity means, as a general rule, greater accessibility and as an apt example of the relation of the one to the other some of the methods adopted by the manufacturers of the

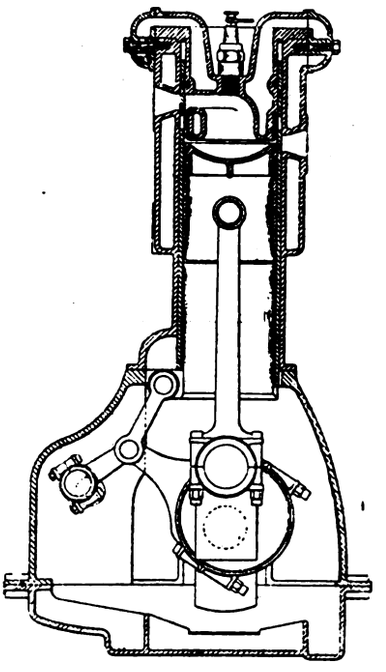

BRENNA INTAKE UNIT

Brenna car, which is a foreign product, in rendering less complex operations of adjustment or replacement are worthy of more than passing note. Referring to the accompanying sketch, for instance, gas intake and cooling water manifolds have been combined in a manner that is at once unique and praiseworthy. Though the piping for gas and water is quite separate it is cast as a unit and so formed at its lower extremity that a large water jacketed chamber directly above and forming part of the carburetter is provided to assist in vaporizing the fuel. Consequently separate water piping to the carburetter is unnecessary. Another of the advantageous features of the construction is that the whole unit may be easily and quickly removed by loosening two nuts. Clutch design in the same case also exhibits a laudable effort toward simplification though the method in use is neither novel nor new. It has been in use on a number of American cars for some time and is embraced in the substitution of two clutch springs, arranged on either side of the driving shaft, where they are instantly accessible, instead of a single spiral member which is more or less inaccessible and difficult of adjustment.

WOLSELEY TAKES UP SLEEVE VALVE

British Manufacturer of Prominence Secures Rights to Recently Patented Engine—Simplicity One of Its Virtues.

Despite the popularity to which the rotary and piston valve has attained abroad, there is no lack of evidence that there are those who believe that with neither of these types of mechanism is perfection of operation to be obtained. The reciprocating sleeve valve continues to be attempted with no little success in a number of instances and the imitations of Knight's design almost are legion. That many of the newer mechanisms which are brought out


WOLSELEY SLEEVE-VALVE ENGINE

are not the inventions of mere individuals, but bear the stamp of approval of some of the biggest and best-known manufacturers, carries its own significance.

The latest of the really big foreign manufacturers to invade the field of the reciprocating sleeve valve engine with serious intent is the Wolseley Tool & Motor Car Co., Ltd., well known as the producers of Wolseley cars and Wolseley-Siddeley marine motors, a British patent, No. 1,421, having been issued jointly to this firm and A. A. Remington and A. J. Rowledge on a sleeve valve engine which appears to hold forth real promise, inasmuch as the designs are for rather simpler construction than the average poppet-valveless engine. Referring to the accompanying drawing, the cylinder encloses a single sliding sleeve, on which the piston reciprocates and which has two elongated ports, one on either side, which serve for intake and exhaust, respectively. These two ports register alternately with two ports in the cylinder wall,

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which communicate with the carburetter and the exhaust manifold. The upper cylinder port, which is shown at the left side of the picture, is the intake port and on the induction stroke the sleeve moves upward until its port registers with the cylinder port. The movement of the sleeve downward registers the exhaust sleeve port with the exhaust cylinder port.

The most noteworthy feature of the design, barring its inherent simplicity, is the method of sleeve actuation, which is such that the reciprocation is rapid except during the time the intake valve is open and during compression and firing strokes. The method of achieving this very desirable end is best made plain with the aid of the picture. The movement of the sleeve is effected by means of a toggle mechanism and a link which operates on an eccentric on the timing shaft. The point of connection between the eccentric-operated crank and the sleeve link is connected to a second eccntric on the crankshaft, the effect of this unusual construction being that there is a decided "dwell" during intake, compression and firing strokes. Another of the noteworthy features of the design is that the intake gases do not pass through ports that have ben heated by the exhaust and therefore retain their "life" to a greater degree.

Vexatious Cause of Magneto Trouble.

The high electric potential of the current passing through the distributer of a high tension magneto permits the passage of the current through paths of very high resistance, so that leakages are much more frequent, and are caused by discrepancies of slighter magnitude than is the case where a separate coil is used for each cylinder in conjunction with a low tension "timer." For instance, it not infrequently happens that where a carbon brush is used in conjunction with the distributer, sufficient loss will result from the small amount of carbon deposited in any slight ridges formed in the insulating material which carries the contacts, sadly to cripple the operation of the device, and the trouble is more or less difficult to locate. Correction of this fault very readily can be made by thoroughly polishing the commutator with precipitated chalk, care being exercised, however, to remove all of the polishing medium at the completion of the operation. Should any of the chalk be left after the polishing is completed it is quite likely to give as much trouble as was experienced before it was applied.

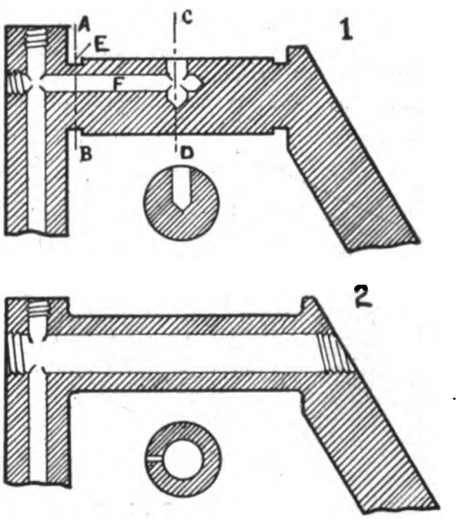
Rubber Matting That Saves Radiators.

The life of a radiator sometimes can be prolonged simply by providing a piece of rubber matting between the radiator frame and the car frame or the brackets to which the radiator is attached. This practice relieves the maze of tubing of many of the twisting strains which otherwise it would receive from the car frame, and which cause cracking of the tubes as well as the solder.

FAILURES OF THE CRANK SHAFT

Some of the Things That Contribute to That Undesirable End—How Crystalization May Be Caused.

The tendency of metals to crystalize under severe strains, or what amounts to the same thing, under undue vibration, is a problem which has been much studied by automobile designers, with the result that most of the parts now employed which are subject to strain or to vibration are made of special material and of such ample dimensions that the chances of crystalization are reduced to a minimum. It is readily understandable, therefore, why the design of a crank shaft, subject as it is to more severe and more regular vibration



OIL DUCTS GOOD AND BAD

and strains than any other part of the car calls for exercise of great caution in order that one part or section of the shaft shall not be subject to strains and vibration more severe than the rest of the shaft, for if such is the case, as Omnia points out, the flexture of the shaft at the weak spot will tend to hasten crystalization and to localize it. This is easily illustrated by taking an iron bar of uniform cross section, and hammering it on an anvil. The bar will bend, but will not break. If, however, the bar is nicked by means of a cold chisel and the hammering repeated, the bar will part at the point where it was nicked after a few blows of the hammer.

Although the breakage of a crankshaft is of rather rare occurrence, it is not altogether unknown, and may in most cases be attributed to causes similar to that which caused the rupture of the bar. Take, for example, the section of the shaft shown at (1) in the figure. The oil hole (c), which is drilled in the crank pin to meet the oil duct (f) weakens the pin along the line (cd) so that crystalization is liable to cause failure. Likewise the groove (e) weakens the pin across the section (ab) and the corresponding groove on the other end of the pin also has its effect in localizing the tendency toward crystalization. The design at (2), it is claimed, is much better, for although the oil duct is very much greater in diameter, the tendency toward crystalization is very much reduced by the fact that the section of the shaft is homogeneous throughout. The smaller figures represent cross sections of the two pins taken at the middle.

Another cause of crank shaft failure, says the French publication, is the flexure of the shaft which is permissible when the center bearing of a three-bearing crank shaft is allowed to wear without replacement, while the end bearings are constantly kept in perfect condition. This flexture instead of being distributed equally throughout the length of the shaft, as would be the case with the cylindrical shaft, is localized, with the result that crystalization and failure of one of the middle cranks generally is the result. It is obvious that too much care cannot be exercised to keep all three of the bearings in prime condition so that undue vibration of the shaft is impossible.

Locking Flywheel to Prevent Theft.

While the results of the efforts of a host of inventors to evolve a simple and positive automobile lock are reflected in the numerous ignition and gasolene line locks that within a comparatively short time have been placed on the market, a French inventor has attacked the problem from an entirely different angle and has evolved a device that not only prevents a car from being driven under its own power, but makes it impossible even for the engine to be "turned over," regardless of whether the ignition or the gasolene or both are locked or unlocked. It does not, however, prevent a car being moved by manual labor or by towing, as in the case of a garage fire for instance, and thus approximates the ideal lock. It is styled the "Blocauto" and is marketed by M. J. Louvegnez, 4 Impasse Bayton, Paris. It is nothing more or less than a small steel plug that fits into a hole drilled in the periphery of the flywheel. The plug is mounted in a suitable receptacle which is bolted to one of the cross frame members and is operated by means of a bowden wire from the dash. The key which controls the position of the plug operates through mechanism to a Yale lock and as it is impossible to close the ignition switch until the plug is withdrawn from the hole in the flywheel there is no danger of harm resulting to the engine through a premature start "on the spark."

Rounded Edges for Unshackled Springs.

Truck springs which are not shackled so as to allow of movement, but are arranged to slide on plates fastened to the frame, should have the ends well rounded with a file, so that sharp edges or corners cannot cut into the slide plates and form ridges which are not conducive either to smooth or quiet operation.

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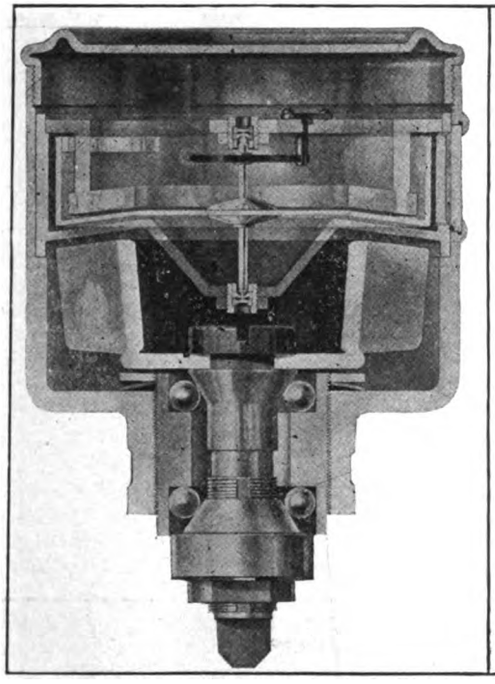
SPEEDOMETERS AND THEIR PRINCIPLES OF OPERATION

Conditions That Give Rise to Their Employment and Why and Wherein Dial Indications Differ From Actual Rates of Speed—Methods of Compensation Brought to Bear—Dissection of the Varied Mechanisms That Are Used to Achieve the Same Purpose.

Speed, so says the dictionary, is the rate of motion of a body as measured by the space passed over in a given time. From the simplicity of the definition, it would seem that the determination of the rate of motion of a body, provided one were carried along with the moving object, would resolve itself into the simple matter of not-

great extent. Then too the size, shape, color and location of the stationary object with regard to the position of the eye of the observer all have their effects toward deceiving the vision, and as the speed of the moving object increases, the effects and the inaccuracies which are dependent upon them are multiplied.

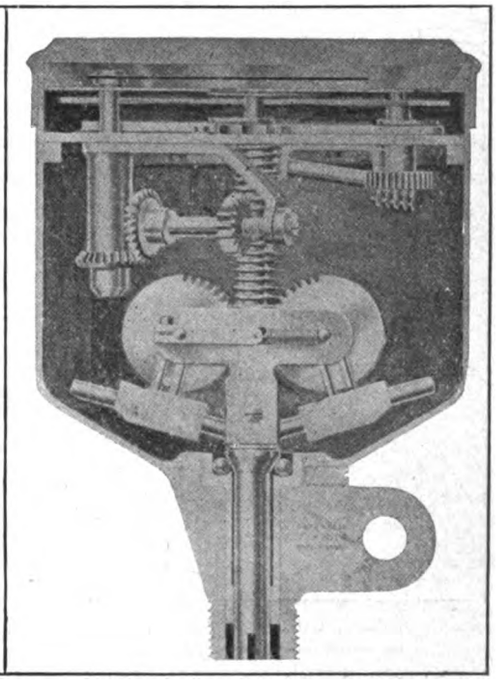
which are set up due to the velocity, than the actual speed, and thus the complications involved in the combination of a double set of readings are removed. In other words, a speedometer is in reality nothing more than a dynamometer, an instrument used to determine the magnitude of forces. The different forces measured, and the



WARNER MAGNETIC DRAG



STEWART MECHANISM



STANDARD CENTRIFUGAL TYPE

ing the difference of time of passing of two stationary objects set at a known distance apart. Which is true, but if the facility with which the senses and especially the sense of sight, of the average human being are deceived is considered, the utter impossibility of noting the time of passing of an object with any degree of accuracy, without the aid of mechanical appliances, immediately stands forth.

Thus, to determine the exact time of passing of an object involves the mental erection of a right angle between the path of travel of the moving object, and the line of sight to the object which is being passed, an operation which is more or less difficult when time is of no importance, but which is practically impossible of accomplishment in the short interval permitted by the movement of the vehicle, so that only when the velocity of the body in motion is very slow can this method of determining the speed be relied upon at all, and even then to no

Paralax, that phenomenon, which would make it seem that the farther a stationary object is from the observer, the slower the movement of the moving object with regard to the stationary object, also plays an important part in rendering valueless speeds determined by means of the sense of sight.

From the fact that the speed of the car or the velocity as more properly it should be called, is determined by means of the distance covered, and the time taken to cover the distance, it would seem that a mechanical device or meter which would give a direct reading of the velocity of the machine must of necessity measure both the element of distance and the element of time. Although this in a measure is true, and there are speedometers on the market which have incorporated in the design both a distance meter and a chronometer, by far the greater number of manufacturers prefer rather to measure the effects of the speed of the machine, that is, forces

various methods of measuring them so as to insure accuracy, and facility in reading, as well as durability of the product are the points of divergence which lend variety to speedometer practice, which in itself is an interesting study which meets with scant appreciation. Comparatively few of the tens of thousands of those who use speedometers have even a faint idea of what the "insides" of their instruments look like.

Several speedometer manufacturers, and among them are some whose products are not the least known nor the least widely used, adhere to the magnetic principle in the design of their instruments. The modus operandi of devices operating on this principle is simple: An aluminum or aluminum alloy disc is balanced on a pivotal support so that it is free to rotate, but rotation is prevented, or to be more precise, is controlled by a hair spring, one end of which is attached to the pivot and the other to a stationary object, such as the case. The

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disc is so mounted as to come in close proximity with a permanent magnet also in disc form, and likewise mounted so that it can be rotated on an axis which is concentric with the axis of rotation of the aluminum disc. When the magnet is rotated, the magnetic lines of force which emanate from it are caused to whirl and this whirling causes a "magnetic drag" which tends to cause the lighter disc to turn. The amount of force which is exerted on the aluminum disc by the "drag" is proportional to the speed of rotation of the magnet, that is, if the speed is such that the lighter disc is caused to rotate a quarter of a revolution against the action of the restraining spring, when the speed is doubled, the aluminum disc will rotate half a revolution. If a pointer be attached, to the disc and arranged so as to traverse a dial, the magnet being in positive connection with one of the wheels of the automobile, so that the rotation of the magnet is proportional to the speed of the machine, it is obvious that the travel of the pointer will also be proportional to the speed of the machine, and that therefore the dial can be uniformly graduated with an arbitrary scale denoting miles per hour.

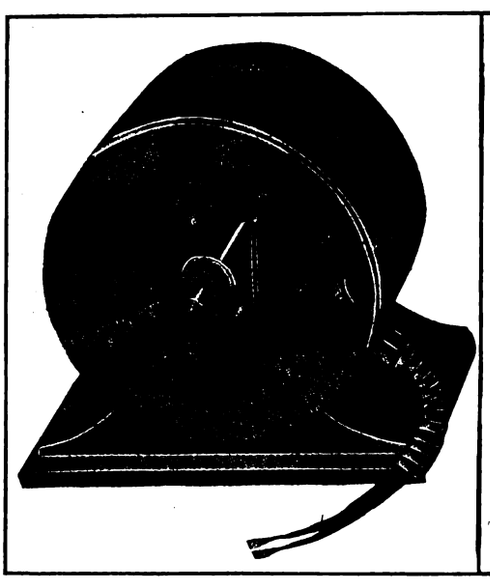
In the Stewart speedometer, as made by Stewart & Clark Mfg. Co., Chicago, Ill., the body which takes the place of the aluminum disc and to which the pointer is attached is cup-shaped, and the flange, which is perpendicular to the base of the cup protrudes into a recess formed between the periphery of the circular laminated magnet and a non-magnetized steel ring which is insulated from the magnet by an aluminum casting which serves to support and to rotate them both. The steel arbor which carries the cup, also supports the indicating needle, and is mounted in sapphire bearings which are set in a yoke. The whole yoke can be shifted so as to vary the air gap between the cup and the magnet, adjustments for correcting the readings being made in this manner. The aluminum casting bearing the magnet is mounted on ball bearings and is driven by a bevel gear which engages with teeth cut in the under side of the ring. Steadiness is insured by the perfect balance of the indicating member; the cup itself being perfectly symmetric, can easily be balanced, while the long arm of indicating needle is counterpoised by a short tail piece so that shocks, jars and jolts, come from whatever direction they may, have no effective moment with regard to the rotation of the indicating member, or it might better be said any moments due to shocks which would tend to turn the member are counteracted by equal moments tending to turn the member in the opposite direction. The alloy used in the manufacture of the cup on the Stewart instrument is such that changes of temperature do not cause expansion and thus the necessity of a compensating device to maintain the air gap constant during temperature changes is dispensed with.

The Warner Autometer, which is manufactured by the Warner Instrument Co., of Beloit, Wis., also operates on the magnetic principle; the aluminum cup, however, is housed in a cage which fits snugly into the speedometer casing. The flange of the cup carries the dial, the figures being read one at a time through a sight hole in the casing of the instrument. Thus the use of a needle is avoided, and it is impossible to mistake the correct reading, for only one figure is visible at a time and that represents the speed of travel. Steadiness in this case also is insured by perfect balancing of the dial cup. The magnet is so mounted in the ball bearings that a slight turn of the raceway which is screwed into the case, either will raise or lower the magnet, thus increasing or decreasing the air gap.

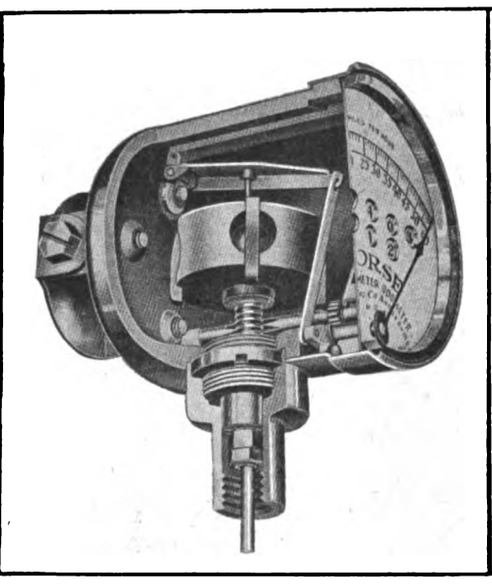
Analogous to the magnetic principle, is that which is embraced in the design of the Casgrain Speedometer, which is manufactured in Boston, Mass., by the Automatic Appliance Co. Instead, however, of utilizing a magnetic whirl, the manufacturers of the Casgrain have utilized the current caused by the motion of a paddle wheel revolving in a liquid to effect a drag on the dial bearing member, and with a similar effect. The dial of the Casgrain is cylindrical in form and carries a large legible figure for each mile, the figures appearing before a "window" as in the Warner.

In the greater number of speedometers now on the market, however, centrifugal force is used as the means of actuating the indicating device. A "fly-ball' governor or a modification of a fly-ball governor most generally is incorporated in the design, the driving shaft connecting the wheel of the vehicle to the governor spindle, so that the rate of revolution of the governor is variable according to the revolutions of the wheel, or in other words the speed of the vehicle. The balls or weights of the governor are linked to the indicating needle through the intermediary of compensating springs, cams, levers, etc., according to the type of instrument.

The necessity for compensating apparatus of one kind or another easily can be realized when it is considered that the force tending to separate the balls varies not directly with the speed of the balls, but as the square of the speed of the balls. That is if the force when the speed of the balls is two feet per second is 10 pounds, when they have attained double the speed the force instead of being doubled is quadrupled, or is 40 pounds. Obviously if the force were counteracted by a spring of uniform cross-section the tension on which varies, within its elastic limit, directly as the elongation, the spring would permit double the movement of the pointer when the speed of the balls was increasing from two



HOPKINS CURRENT GENERATOR



FORSE CONSTRUCTION

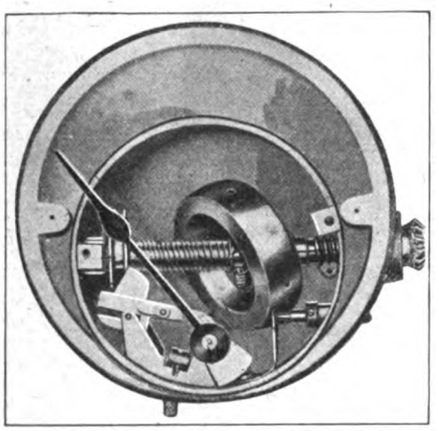


HOPKINS RECORDING DEVICE

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to four feet per second, that it would when the balls were acquiring the speed of two feet per second from rest. Consequently without compensating apparatus an evenly divided scale is an impossibility, for the graduations would be very much larger at the points indicating high speeds than are the graduations indicating low speeds.

The governor of the Standard speedometer, made by the Standard Thermometer Co., Boston, Mass., embraces the use of two balanced weights arranged so as to slide outwardly on guide rods. Movement is imparted to the indicator through the intermediary of two sector wheels which are moved by the sliding weights, and which engage with a circular vertical rack. The motion of the rack is imparted to the needle through a set of gears. A single spiral spring connected to each sector wheel by means of a lever mounted on the shaft opposes the movement of the weights, the connection is such, however, that the spring can exert considerably more force in its effort to prevent the motion of the weights

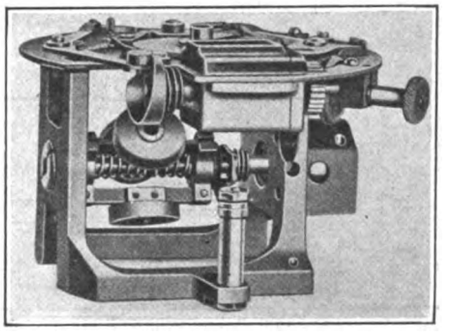


JONES RING GOVERNOR PRINCIPLE

at high speed, than is possible at low speeds, where the turning moment of the spring on the lever is small. The weights being arranged so as to slide in a straight line, less motion also is imparted to the sector wheels for a given movement at high speeds than for the same amount of movement when the velocity is low. The conjunction of the two methods of securing compensation render possible a uniformly graduated scale.

The "good old" Jones speedometer depends for its accuracy and for its steadiness on the movement of a ring mounted on diametric pivots on which it is free to move within limits. The pivots are fastened to a shaft connected with the flexible driving shaft. A special spring holds the ring in such a position with regard to the rotating shaft that the faces of the ring are not perpendicular to the axis of rotation except at high speeds. As the speed of rotation increases the centrifugal forces acting on the ring tend to cause it to rotate with the faces perpendicular to the shaft and the consequent movement of the ring on the pivots against the aetion of the spring is imparted to the indicating needle through a specially designed cam which makes uniform calibration possible. Steadiness is induced by the gyroscopic action of the rapidly revolving ring.

The Forse instrument, produced by the Forse Mfg. Co., of Anderson, Ind., utilizes the movement of four metallic balls, freely mounted so that they can fly outward through radial passages formed in a cylindrical cage mounted on the driven shaft. As the balls move outward, they tend to raise a yoke, the faces of which are cut in the form of a parabola with the points of greatest curvature on the outside ends, which makes plain that the vertical elements of the forces are very much greater at low speeds than at high, so that compensation is affected; the movement of the

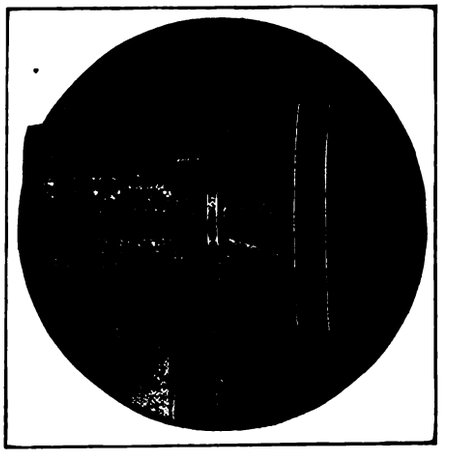


HOFFACKER CONSTRUCTION

yoke is the same for a given change in velocity at any speed. Uniform graduation of the dial therefore is possible without further complication, the needle being directly connected to the movable yoke. The Star speedometer employs a helical spring of varying cross section, as a means of obtaining uniform motion throughout the compass of the needle. The doubly weighted fly ball governor is driven at twice the shaft speed which makes for accuracy in the readings at the lower speeds, and furthermore it is balanced by means of a wheel mounted on the shaft, which renders vibration of the pointer next to impossible. Hoffacker practice embraces the use of a triply weighted governor, perfectly balanced and so constructed that the balls or weights revolve always in same plain, which practice, it is stated, conduces to steadiness.

Of the centrifugal type, but differing greatly in appearance from all others, is the Veeder speedometer, made by the Veeder Mfg. Co., of Hartford, Conn., which employs as an indicating medium a column of colored petroleum which is caused to ascend within a glass tube by the varying pressure created by the action of centrifugal force on the liquid itself. The liquid is led from a reservoir to the center of a paddle wheel which is driven by the shaft from the road wheel. The paddle is enclosed in a casing through which very small orifices lead to an annular passage formed in the outside casing of the instrument, which passage connects with the indicating glass tube. The rotation of the paddle caused the liquid to flow through the small holes to the passage outside according to the pressure which is dependent upon the speed. Since the centrifugal force with the liquid also increases as the square of the velocity, the production of a uniformly graduated scale is difficult, the consequent "shyness" of the spaces corresponding to the slower velocities which would render reading of the instrument at slow speeds difficult, has been remedied by the employment of both a high and a low speed scale which register to 60 and to 30 miles' respectively, either of which can be employed at the will or the whim of the operator.

Electric speedometers are few and far between, although the design of such is not particularly difficult. If the strength of a field of a dynamo remains constant, and the resistance of the circuit is not varied, the voltage or potential difference across the brushes of the machine varies directly as the speed of rotation of the armature.



STAR ASSEMBLY DETAILS

It needs but a permanent magnet for a field and the employment of a "dead beat" voltmeter graduated in miles per hour instead of volts to indicate the speed of a vehicle, and this with a few "finishing" touches directed toward improving the operation of the couple, is all there is to the Hopkins Electric speedometer made by the Electric Speedometer Co. Washington, D. C. which is one of the few "electrics" on the market. The parts of the machine which would tend to cause inaccuracy were they to corrode and add resistance, are made of gold; two flexible cables conduct the current from the brushes to the voltmeter, which, naturally, is positioned on the dash.

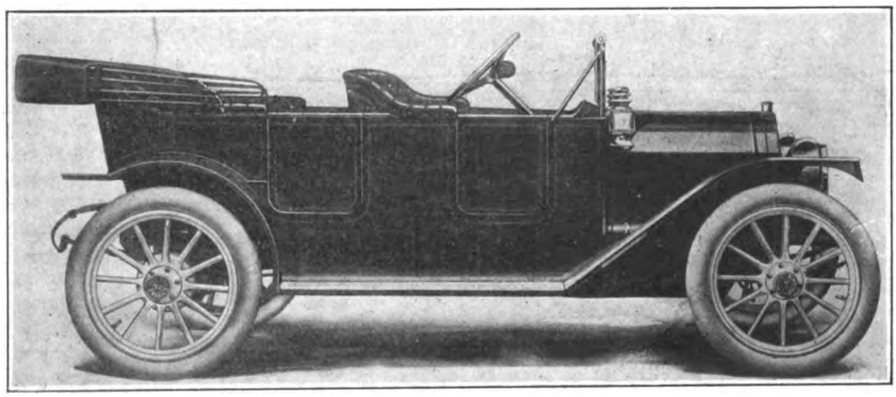
It is, however, not so much the principle on which a speedometer works which insures accuracy as the materials and care used in construction. Speed indicators working on either the magnetic, centrifugal, or electric principles have been and are being made accurate, the degree of accuracy being in a great measure dependent upon the conscienciousness of the respective manufacturer.

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MODERNIZATION OF THE EMPIRE

Revived by New Company and Made More Attractive Than Before—Features That Characterize the New Model.

After having been off the market for about a year the Empire has been revived, so to speak, that is the Empire car, the revivalist being the new company headed by C. E. Gibson, which, some three months since, took over the name and other assets of the former Empire Motor Car Co., of Indianapolis, Ind., and reorganized under the name of the Empire Automobile Co. The first visible result of the new order of things is a car, belonging to the moderate priced class, styled the "Empire 25" and embodying a number of modern features, such as three-speed selective transmission, long-stroke motor and center control.



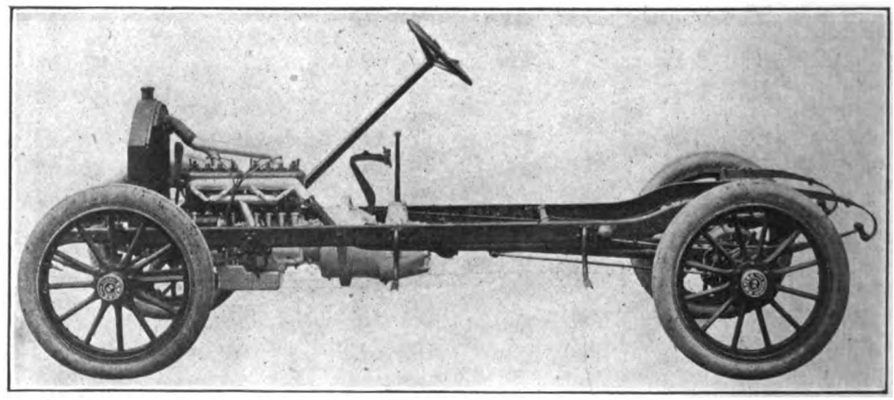
SIDE VIEW OF FIVE-PASSENGER EMPIRE "25"

Having a bore of 3½ inches and a stroke of 4½ inches, the motor may be said to come easily within the long-stroke class limits. Its cylinders, cast in pairs, are of the L-head type, having the valves on the left side, fully enclosed and the lifters adjustable for the inevitable wear; valve openings are 1½ inches in diameter in the clear. There is an ample area of bearing surface for the three-bearing crankshaft; the shaft itself, both in the main bearings and the crankpins, is 1½ inches in diameter, except at the flywheel bearing, where it is an eighth of an inch larger. The flywheel bearing is 4 inches long, the front bearing 3½ inches long and the intermediate bearing 2¾ inches long; connecting rod bearing are 2 inches long. Lubrication is by splash, a constant level being maintained by a mechanically driven pump. The time of ignition is fixed at the factory and is not variable; a high tension magneto is the source of ignition current. The cooling water is circulated by gravity.

Approved practice is followed in the employment of a disk clutch with Raybestos facings, running dry, a three-speed selective change speed gear with central control lever mounted on the top of the gearbox, and propeller shaft drive to the rear axle, which is of the semi-floating variety. The change gears are of ⅞ inch face and the gear shafts are mounted on annulad ball bearings. Between the motor and the gearbox is a casing which encloses the flywheel; both motor and gearbox are bolted to the flywheel housing, the whole constituting a unit power plant. The steering wheel, 17 inches in diameter, is on the right side, and carries only one lever, that for operating the throttle, the spark being fixed. Clutch, service brake and emergency brake are pedal actuated; the service brakes are internal expanding and the emergency brakes external contracting, all on the usual drums on the rear wheels. The clutch interlocks with the service brake, the application of that brake disengaging the clutch.

The pressed channel steel frame has a rear "kick-up" and is carried on three-quarter elliptic springs in the rear and semi-elliptics in front; clips are fitted to prevent breakage on the rebound. A steel drop forging of the standard I-beam section forms the front axle. The wood artillery wheels, with a diameter of 32 inches, are fitted with quick detachable rims. Wheelbase, 104 inches.

In the construction of the body aluminum coated sheet steel is employed, with wood trimmings, with one-piece cast dash having the skuttle integrally formed. The body lines are straight from front to rear, and the exterior appearance is enhanced by placing the door handles inside, and by nickel plating all the metal trimmings. Seat cushions are arranged at the comfortable angle that has become popular, and the upholstery is quite deep and easy. Webbed fenders protect the passengers and the body of the car from splashing mud and water. The gasolene tank occupies the usual space under the front seat and has a capacity of 12 gallons. Standard equipment includes two gas lamps, two oil lamps, tail lamp, tools, tire repair kit, jack, pump and horn, an outfit that is calculated by the manufacturers to go a long way toward supplying the accessories desired by the owner.



EMPIRE "25" CHASSIS IN ELEVATION, SHOWING CENTER CONTROL.

Truck Insurance That is Far-reaching.

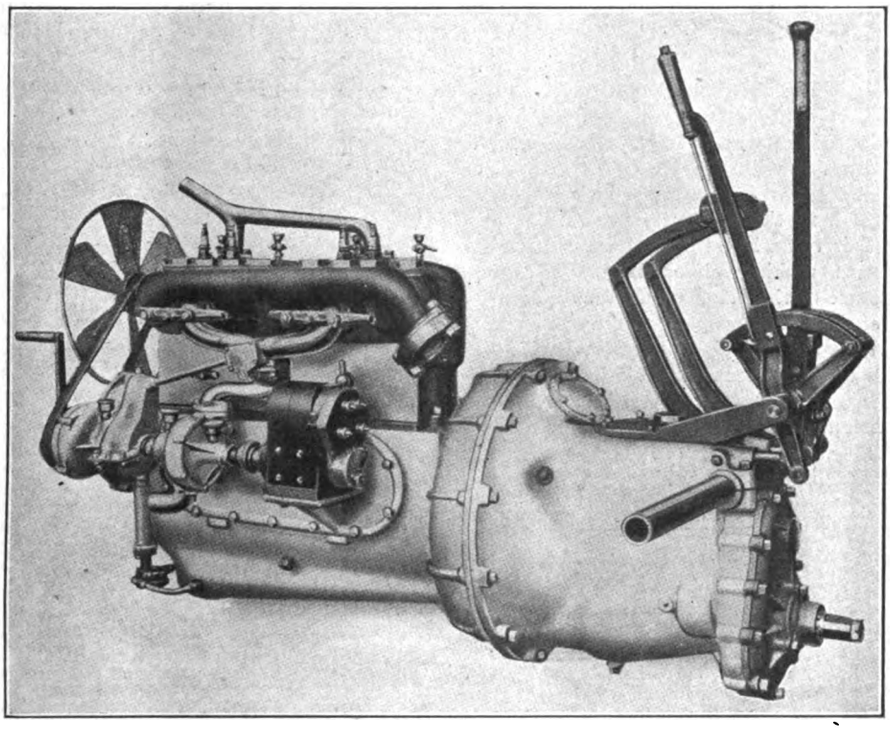
While the insuring of motor cars and trucks has been carried on as long as the premiums have been reasonable enough to appeal to car users, it always has been done as a separate business. Now, however, it is possible for the purchaser of certain commercial motor vehicles to get his insurance policy, along with the truck, from the concern that sells the machine. This novel combination of motor car and insurance business has been worked out by the Commercial Motor Vehicle Co., of 2637 Cottage Grove avenue, Chicago, which handles Avery and Stegeman trucks and proposes also to handle a line of light commercial vehicles carrying from 800 to 1,500 pounds. It comprises a "special guarantee contract," which costs from 4 per cent. to 7½ per cent. of the manufacturer's invoice price of a truck, and which for a $3,000 car would cost $135, the company agrees—and asserts that the agreement will be backed by a bond if required—to renew or replace any parts broken or worn out "under normal use and service," to replace or repair the car if destroyed or damaged by fire "arising from any cause whatsoever," or if "damaged or destroyed by reason of the stranding, sinking or collision, burning or derailment of any conveyance, by land or water," by which the machine may be carried; or if "lost or damaged by theft, robbery or pilferage"—provided, however, that such loss or damage is caused by "the act of persons other than those in the employment" of the owner of the vehicle.

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TO ELIMINATE JACKSHAFT DRIVE

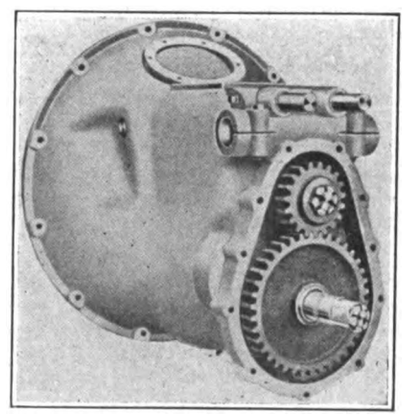
Integral Gear Reduction Feature of New Hazard Unit—Has Governor and is Intended for Light Trucks.

By way of decreasing the maintenance expense of the lighter forms of commercial vehicles, and thereby increasing their efficiency and all around utility, the Hazard Motor Mfg. Co., Rochester, N. Y., has struck out in a new direction and added to its line of power plants and separate engines a new type of unit power plant with an integral gear reduction that is calculated to eliminate the necessity for side chain drive and thus to remove what has been viewed in the light of an obstacle to the production of successful vehicles by not a few manufacturers of delivery wagons and trucks varying in capacity from 1,500 pounds to two tons.



HAZARD UNIT POWER PLANT WITH INTEGRAL GEAR REDUCTION

Though the integral gear reduction serves its most useful purpose in doing away with the necessity for side chains, which heretofore have been relied upon almost exclusively in order to obtain the reduction of ratio between engine speed and road wheel speed which is necessary in commercial vehicles, its use permits the realization of a practically straight-line drive from the engine to the rear axle and consequently increases the power available for traction. The simplicity of the device may be judged from the accompanying illustrations, one of which shows the gear reduction with part of the casing removed for inspection. Instead of the propeller shaft being in effect a continuation of the "straight-through" shaft in the change gear mechanism, it is placed several inches lower down and connected to the driving shaft through the intermediary of wide-faced accurately ground spur gears. As regularly supplied, the gear reduction may be either 2 or 2½ to 1, which with a standard reduction at the differential of 4 to 1 permits a total reduction without the necessity for side chains of either 8 to 1 or 10 to 1. Incidentally, the Hazard integral gear reduction permits shaft drive without the necessity for materially increasing the dimensions of the differential housing and thereby reducing road clearance. The reduction gears, together with their shafts, are made of heat treated manganese steel and are carefully ground to ensure quietness in operation. The shafts are mounted on annular ball bearings.



HAZARD GEAR REDUCTION

The standard unit on which the integral gear reduction is supplied differs but little from the regular Hazard unit power plant and consist of a four-cylinder engine in two sizes—3¼x4½ and 4x4½ inches, bore and stroke, respectively—multiple disk clutch operating in an oil bath and three speed selectively operated change gear mechanism. As is usual with all Hazard motors particular pains are taken to insure minimum wear and to this end all moving parts are enclosed in dust-proof cases and insofar as is possible operate in oil. A centrifugal governor forms part of the unit, as becomes a power plant which is expected to operate at its greatest efficiency, and may be sealed to limit the vehicle speed according to the requirements of the owner. The power plant is arranged for three point support.

Piston Displacement and the Theory.

While the term "piston displacement," commonly used in rating motor car engines for racing events, is clear enough to people familiar with the technical side of motoring, that portion of the population usually termed the "lay public" has a hazy notion that it means the total cubic contents of the whole cylinder, or of the combustion chamber, or something else which it does not. As a matter of fact, the piston displacement of a motor is the cubic contents of that part of the cylinder through which a given part of the piston moves during one stroke. This distance will, of course, be the length of the stroke, so that in a motor having a stroke of five inches and a bore of four inches, the piston displacement would be the cubic area of a cylindrical space four inches in diameter and five inches long. The calculation is made by multiplying the area of the cylinder, in square inches, by the length of the stroke, which gives the cubic contents in inches. The area of a four-inch circle is 12.566 inches; multiplied by the stroke, five inches, this gives 62.83 inches as the piston displacement. The piston displacement of the motor will, of course, be the piston displacement of one cylinder multiplied by the number of cylinders. In the case of the 4 x 5 motor having four cylinders, the figure will be 251.32 cubic inches. The combustion chamber does not enter into the calculation in any way. The theory of this method of rating motors is that the greater the volume of gas the piston draws in on the intake stroke, the greater will be the force of the explosion and the higher the power of the motor. As the volume of gas drawn in is equal—theoretically—to the space swept by the piston, the bore and stroke are taken as the working basis. In actual practice the volume taken in is always something less than the space it is drawn into, because it is not possible to start the gas moving fast enough to fill the cylinder at atmospheric pressure, so that at the end of the intake stroke there is a slight partial vacuum in the cylinder. The rule has this advantage, however, that it encourages builders to get all the gas, as much gas as possible, into their cylinders, which, other things being equal, means the maximum power from a cylinder of a given size.

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Staggered Tread Not Patentable.
(Continued from Page 23.)

"The defenses are: (1) Invalidity; (2) Non-infringement.

"In considering the question of the validity of the patent we should look, in the first place, for the disclosure in the prior art which seems to approach most closely the claimed invention, and our attention is at once attracted to the English patent granted to Healy in 1895. Taking up then the Healy patent we may conveniently test the question of anticipation with reference to the rule that that which infringes if later anticipates if earlier. Let us then assume that the Healy patent is of later date than the patent in suit and see whether it infringes.

"The patent in suit is for an improved outer surface of a vehicle tire and it is not limited in scope to any class of vehicles, although an automobile is indicated as an example of an appropriate use. The Healy patent is also for an improved outer surface of a tire and likewise is not limited to any class of vehicles, although cycles are mentioned particularly. The structure of the patent in suit is designed especially for use in connection with pneumatic tires, but may be used with other tires. The Healy patent is confined to pneumatic tires. This distinction is not of importance, however, as all the tires in question in this case are pneumatic tires.

"The primary object of the structure of the patent is to give good road-gripping qualities and reduce to a minimum 'all side skidding tendencies.' The purpose of the Healy structure is to give a better 'bite' and prevent side-slipping. The patentee seeks to accomplish his object by providing the tread surface of the tire with a circumferential arrangement of elongated outwardly projecting studs arranged so as to break joints. Healy seeks to obtain the same object by a similar arrangement of elongated outwardly projecting studs.

"From the examination thus far made it is apparent that the present patentee and the Healy seek to accomplish the same object and to accomplish it, so far as now disclosed, in substantially the same way. The Healy patent would clearly infringe unless there are some minor differences in construction which differentiate it from the patent in suit. And the only differences claimed to exist are those relating to the form of the projecting studs.

"It is pointed out that the studs of the claim in issue have inwardly diverging walls with flat outer surfaces while the Healy studs are described as being semi-circular in cross-section. It is also pointed out that the studs of the claim have a relatively large base, and if we assume that this requirement means something more than the requirement of inwardly diverging walls and implies a fillet at the base of the studs, the presence of such fillets constitutes another difference in form from the Healy studs.

"The patents accomplishing the same object in so nearly the same way, we regard it as very doubtful whether the Healy structure would avoid infringement by the mere differences in the form of the studs if it were later, and being earlier, we have the same doubt whether it does not anticipate. Possibly, however, precise anticipation does not appear, and we deem it desirable to proceed further with the examination and determine whether, with the Healy patent alone or with other patents in the prior art, invention is to be found in the patent in suit.

"We might consider this question altogether in the abstract. But we can do better than that in this case. The record shows the patentee—Mr. Mell—actually starting out with the Healy structure, and the changes which he made in it for which he obtained the present patent. The case is rather remarkable in that we can see the patentee making changes in the nearest structure of the prior art and can determine better than ordinarily whether such changes involved the exercise of the inventive faculties or mere mechanical skill.

"It appears from the testimony that the attention of Mr. Mell—an automobile tire maker—was called to the Healy patent and that he had a tire with a stud arrangement constructed in accordance with that patent for use on an automobile and ran it for some two hundred miles. After this experimental run, the patentee talked about the condition of the tire with his associate Petersen. Petersen called Mell's attention to the fact that many of the studs were gone and that others were badly undercut and Mell said that he could easily remove the objection of undercutting by putting a fillet around the stud and taper it off from the tread. He also suggested that the Healy stud was too pointed; that they were a little too narrow and light, and that more studs should be put on the tread. Thereupon, as Petersen says, 'Mr. Mell and I talked it over in the house and we decided to make the studs more blunt and wider and set them close together and then Mr. Mell went ahead and got up the drawings and had moulds made and we made some tires of that kind.' That was the Staggard tread tire—'Staggard' being the name of the tire made under the patent in suit.

"It is thus quite apparent that the difficulties which appeared in the Healy structure were easy of solution. No experiments were necessary. The remedy seems to have been quite obvious. We think it the better view that any head workmen in the tire art should have been able to make the studs larger and flatter and to provide a filleted base to prevent them from being torn off. The case is one in which the language of Mr. Justice Matthews in Hollister vs. Benedict, 113 U. S., 59, 73, seems applicable:

"'A skilled mechanic, witnessing the performance of a machine, inadequate by reason of some defect, to accomplish the object for which it had been designed, by the application of his common knowledge and experience perceives the reason of the failure, and supplies what is obviously wanting. It is but the display of the expected skill of the calling, and involves only the exercise of the ordinary faculties of reasoning upon the materials supplied by a special knowledge, and the faculty of manipulation which results from its habitual and intelligent practice; and is in no sense the creative work of that inventive faculty which it is the purpose of the Constitution and the patent laws to encourage and reward.'

"But we do not find it necessary to hold that on account of the presence of the Healy patent alone in the prior art, the patent in suit is invalid for want of invention. The Healy patent includes all vehicle tires and would embrace those of automobiles. The patent in suit embraces all tires and would include those of cycles. Assuming, however, that the Healy patent is to be regarded as relating to cycles and the present patent to automobiles and that automobiles require more of tires than cycles, still there were many patents and uses in the prior art showing automobile tires with studs upon their tread surface to prevent skidding and to accomplish the objects stated in the patent. Thus, for example, the Clark British Patent of 1904 shows a cover for pneumatic tires for motor vehicles with studs to prevent skidding or side slipping, and some of the illustrations of this patent show an arrangement of projections quite similar to those of the patent in suit. So the Heinemann British Patent of 1907 shows various arrangements of studs upon the tread surface of motor vehicle tires. The record also shows many uses in the prior art of non-skid automobile tires with projecting studs variously arranged.

"Therefore, in determining whether invention is to be found in making the changes in the Healy tire—regarded as a bicycle tire—to obtain the tire of the patent in suit—regarded as an automobile tire—we must consider the automobile tires shown in the prior art. And considering the art as it is shown to have existed, we are unable to reach any other conclusion than that the tire of the patent in suit, although successful, came into existence through the exercise of mere mechanical skill and not of the inventive faculties.

"The decree of the District Court is reversed with costs and the cause is remanded with instructions to dismiss the bill with costs."

Uncle Sam Sues Long-Named Company.

Suit has been brought by the Federal government in the United States District Court for the Southern District of New York against the United States Touring New York Automobile Co., of 173 Fifth avenue, New York, for $10,000 for alleged failure to file its annual corporation report. Service was made on R. H. Green, secretary of the company.

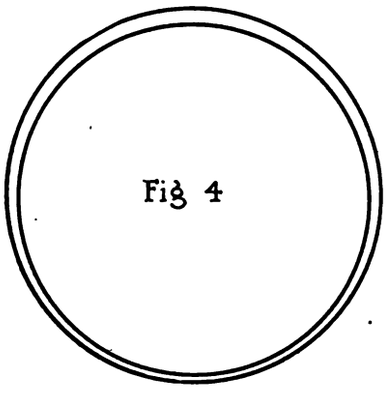
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THEORY AND PRACTICE APPLIED TO PISTON PACKING

Why the Pistons of Gasolene Motors Cannot Be Fitted Gas-Tight in Their Cylinders — Expansion and Distortion That Are Caused by the Heat of Burning Gases — Flexible Rings That Prevent Leakage and Take Up Wear Without Causing Excessive Friction.

Because the gasolene motor is dependent for its operation upon the pressure of an expanding gas on a piston moving within a cylinder, it is of the utmost importance that there shall be as little leakage as possible between the piston and the cylinder walls. Leakage necessarily reduces the pressure above the piston, and reduction of pressure is followed by reduction of power.

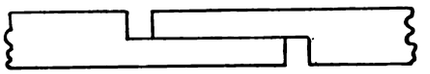
If the prevention of leakage of gas were merely a question of accurate fitting, the making of gas-tight pistons would be a matter of little difficulty in these days of extremely accurate surface grinding, for by careful work it is possible to achieve remarkable results. In making a pair

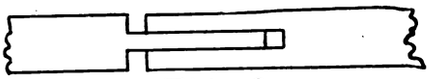


of gauges, consisting of a ring and plug made as nearly as possible the same diameter, the plug to fit the ring, it is possible to make the fit of such amazing accuracy that while the plug can be inserted in the ring when perfectly clean and dry, if it is slightly oiled it will be found impossible to insert it. Even when the gauges are dry, they must be at the right temperature; the plug cannot be inserted if warmed by being held in the hand. The finishing is done in a room having a carefully regulated temperature, and even the heat generated by the friction of the finishing process is minimized by working only a little while at a time. This, of course, is an extreme case, but it shows what can be done, and how far accuracy can be carried.

Making a piston a sufficiently close fit in its cylinder to be gas-tight would not require such accurate work, and could be done in a commercial way if its accomplishment would be of any value. It would do no good, however, for several reasons. In the first place, the cylinder and piston become hot while working, and this results not only in altering the relative sizes of these parts because they are not of the same temperature, but it also causes the walls of the cylinder to become distorted as, due to the influence of the gas passages and ports, the heat is unequally distributed and also because it is impossible to make cylinders of such symmetrical form and of such absolutely even thickness as to prevent distortion. In the second place, even supposing the difficulty of distortion and


Fig. 1


Fig. 2


Fig. 3

variation of size due to heat were eliminated from the problem, there still would remain the effects of friction, which soon would destroy the perfection of the fit, with the able assistance of particles of carbon.

Obviously, then, it is necessary to make pistons a trifle smaller than the cylinders in which they work; in practice just enough clearance is left so that the piston will be quite free in the cylinder when it is expanded by the heat of the burning gas, notwithstanding the unavoidable distortion. This means that gas at the high pressures attained would blow past freely enough to make the gas engine an impracticable motor unless there were some means of preventing such leakage. It is as equally obvious that whatever means is taken to pack the piston must be of such flexibility as to accommodate itself to changes of size and of shape while performing its work. This is where the piston ring comes into play, and it is a device that does its work admirably.

In the early days of the steam engine, piston packing consisted of hemp thoroughly impregnated with tallow and worked into a groove in the piston. This answered very well while the steam engine was a marvelous thing merely because it would run at all and perform work, and efficiency was a matter of small moment and, anyway, was unattainable because there was no accurate machinery for making the parts. Machinery and engines improved, however, and hemp packing was displaced by metallic rings, not only because of its inefficiency in holding the increased pressures and its very considerable friction if made tight, but because it was unsuitable for the greatly increased steam temperatures. So the piston ring as it now is known was evolved, and it is used in the gas engine in the form which was given to it in steam engine work.

In its most familiar form the gas engine piston ring is a cast iron ring having its inside diameter eccentric to its outside diameter, and cut or "split" at the thinnest point. Grooves are cut in the piston, from

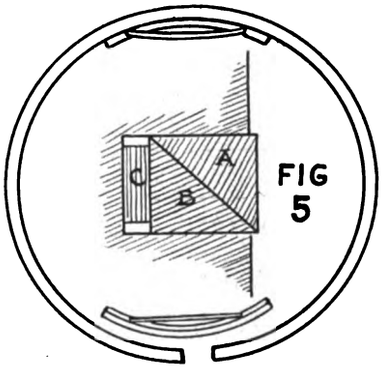


FIG 5

two to five in number, according to the number of rings to be used, being made a little deeper than the thickest part of the rings. The rings are carefully sprung open and put into the grooves, where they fit as closely as possible without binding or sticking. The rings are so made that when in their places in the cylinder they will press outward in all directions equally—theoretically at least—and so automatically follow up wear on the cylinder walls. There is so little motion between the rings and the walls of their grooves that there is practically no wear there. The split in the ring is so made that when the ring is closed in the cylinder the split will be almost closed, just sufficient space being left to permit the ends to practically touch when the ring is expanded by heat. Naturally the split widens a little as the ring and the cylinder walls wear and permit the ring to spread, but except in extreme cases the opening is so small that only an exceedingly small volume of gas can pass. The portion of a piston ring joint through which gas can escape is only that part which lies between the surface of the piston and the

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cylinder wall and, in the other direction, the width of the split. Under actual working conditions the split and the almost infinitesimal spaces between the sides of the ring and the walls of the groove become filled with oil, which tends to thicken up and prevent leakage.

The commonest form of split is the diagonal cut, as shown in Fig. 1, which seems to give the most satisfactory all-round results. As a matter of fact, this might be called the standard form of piston ring joint. A form that still is used in steam engine work to a considerable extent, and has also been used for gas engine rings, is the lap joint, shown in Fig. 2. While at first glance it might seem that the passage of gas through this joint would be blocked by the contact of the overlapping parts, the trouble is that the gas passes under the ring and so goes through, so that while the leakage through a well made ring of this type is perhaps a little less than through a diagonal joint, because of the more devious passage, the difference is not sufficient to compensate for the extra labor and expense involved in manufacture. The same may be said to apply to the form of joint shown in Fig. 3, in which a tongue fits in a groove.

As already has been intimated, the eccentric piston ring is supposed to exert an outward thrust that is practically equal in all directions, which, of course, is conducive to uniform wear and gas-tightness. While there is a great deal that can be said both for and against this theory, it is of an extremely dry and scientific character. The same may be said of the arguments presented by advocates of piston rings which are of the concentric type, being of equal thickness all round. Prominent among those who advocate the concentric ring is the Wasson Piston Ring Co., and the fact that in some cases two rings of this type have been found more satisfactory than four of the older pattern, would seem to bear out the contention. There is a good deal more to the Wasson ring, however, than the mere fact that it is concentric. Part of the process of manufacture consists of hammering or "peining" the inner surface of the ring in a machine designed especially for this purpose, which imparts a permanent springiness to the cast iron that the untreated metal does not possess. The concentric ring, it also may be said, does not need as deep a groove as the eccentric one, which has to have a groove deeper than the thickest part of the ring, while the thin part of the ring only fills a small part of the groove, leaving a considerable space to be filled with gas. A concentric ring requires a groove with very little more bottom clearance than the clearance between the piston and the cylinder walls.

Probably the most complex piston ring used in motor car construction is that in the engine of the Chalmers, shown in Fig. 5, which is a cross section of a groove with the ring in place. The ring consists of a split cast iron ring of triangular cross section and six segments of similar section which are placed in the piston groove behind the ring, being forced by flat springs against the main ring which, in turn, is forced outward against the cylinder walls. As there are six segments, each with its own spring, it will be seen that the ring is given a very even bearing, especially as it is of light construction, and readily adapts itself to the cylinder bore. The spring-backed segments are of such length that when they are all in place they form a complete circle, one of them "breaking the joint" where the outer ring is split. The precise action of the ring is indicated by the sectional drawing in which A is the outer ring and B one of the six segments, in place in the groove, and C the flat spring. The wedging action of the segment B forces the ring A against one wall of the piston groove and the segment itself against the opposite wall, closely filling the space, while both are forced outward and the main ring A is held against the cylinder wall. Thus every possible avenue for the escape of gas is filled by the ring, even the split or joint being "packed" by the segment behind it. The ring is very light, the face which bears against the cylinder wall being only ⅛ of an inch wide, the perfect fit and flexibility of the parts and their automatic tightening action being relied upon to prevent the escape of gas, rather than the mere width in the surfaces of the bearings. There are many other piston rings in use, including spirals, various forms of sectional rings with spring backing, double rings, in which the inner ring acts as a spring to press the outer ring against the cylinder walls, and so on, almost indefinitely. What has been said, however, gives an idea of some of the rings in common use, as well as of the principles upon which piston rings in general perform their offices.

Michelin's Conception of a Repair Kit.

Though the phrase "multum in parvo" has been very much overworked, it aptly may be said to apply to the new tire repair kit that just has been brought out by the Michelin Tire Co., of Milltown, N. J. The



outfit is packed in a metal box that measures but 6 inches in length by 3½ inches wide and 3 inches deep, yet it contains a two-ounce can of Michelin mastic, a similar can of cement, six assorted inner tube patches of red rubber, a blow-out patch or inside envelope, a box of Michelin talc, a piece of emery cloth and a 32-page booklet of directions for making all kinds of tire repairs, and suggestions for the care of tires. The point is made by the Michelin company that the mastic which forms part of the outfit is not merely an adhesive, but is a quick-setting cement for filling cuts in casings as well as for repairing inner tubes and that repairs made by means of this mastic are of a permanent character.

Factory That Treats Visitors as Guests.

Hundreds of visitors are shown through the plant of the Pierce-Arrow Motor Car Co., in Buffalo, every year, and the company has done what it can to make the visit an interesting one, by providing guides and mapping out a route for them to follow through the factory that gives a very good idea of its extent. That it goes still further is shown by the first paragraph in the instructions to guides, which says:

"It should be remembered at all times that this company is not doing visitors a favor by showing them through the factory, and the conduct of the guides in every instance should be governed by the fact that every courtesy they show is due the visitor in return for the opportunity he gave us to show him through the buildings. The outward appearance of the visitor and whether he is apparently a prospective buyer of a car, must not be allowed to govern the conduct of the guides. A general invitation to visit the Pierce-Arrow factory has been extended to every one who may be interested, and any one coming here with a desire to see the plant is the guest of the Pierce-Arrow Motor Car Co. and is to be treated as such in every respect."

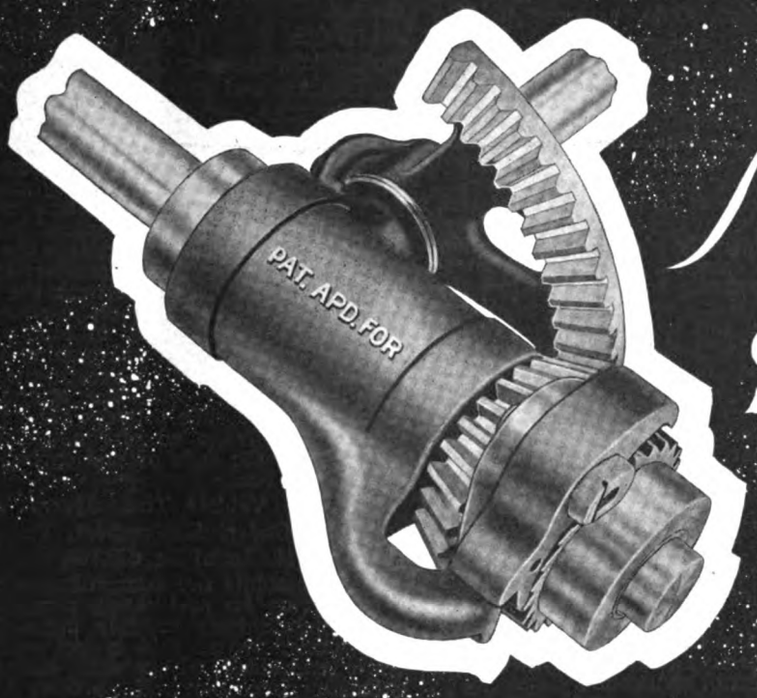
Twisting That Saves Tubular Connections.

When electric light wires are to be connected with an object such as an arc lamp or a sign which is liable to swing, provision always is made for the movement of the object when the wires are connected, the provision most generally taking the form of a "cork screw" twist made in each of the wires, which allows of a certain amount of spring. Similar provision should be made when copper tubing is being installed and connected with controlling or recording apparatus on the dash of an automobile—that is, when tubing is run in connection with an engine starter, acetylene lamp lighter, fuel, oil, air gauges, etc. A couple of turns will lend sufficient flexibility to the tubing to prevent cracking or rupture due to the vibration of the dash.

Protection from Wet That Does Protect.

Turning seat cushions upside down when the car is left outside in rainy weather is all right for once, but the next time it is done the wet side of the cushion will have transferred much of its wetness to the seat, which will in turn transfer it to the erstwhile dry side. The moral is to take the cushions inside or cover them up.

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THE NATIONAL STARTER spins your motor virtually as if it were cranked by hand, but eliminates all the inconvenience and danger connected with hand cranking. It will start your motor any and all times, no matter how long it has stood; no matter what the weather conditions. Should your motor back-fire the NATIONAL automatically throws itself out of gear.

The NATIONAL is a purely mechanical starter, all running parts are fitted with Ball Bearings. It is complete in itself, direct in its application, dependent upon no other source of energy than that derived from a simple pressure of the foot. In the NATIONAL you buy none of the complication, danger, trouble, cost and uncertainty connected with starters which operate on the electric, acetylene gas, compressed air, or spring principle.

The NATIONAL STARTER is extremely simple in construction; it is quickly and easily attached without changing any part of the engine or transmission, and will last indefinitely.

We have an attractive proposition to make to dealers.

National Gas Engine Starter Company
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1,006,759. Yieldable Wheel. John Klatt, Blue Earth, Minn. Filed April 29, 1911. Serial No. 624,154.

1. In combination, an inner and outer rim having resilient leaf springs arranged therebetween, metallic loops arching over the inner rim and connected to the outer rim, the inner rim having a plurality of recesses, to receive the opposite sides of the loops, for holding the inner rim in place, as it vibrates vertically, means for connecting the springs to the inner rim, said springs having lips integral therewith, engageable upon either side of the inner rim to prevent oscillating movement of the springs.

1,006,795. Spark Gap. James D. Robertson, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio, a Corporation of Massachusetts. Filed Nov. 30, 1910. Serial No. 594,920.

1. A device of the class described, comprising a barrel of non-conductive material, said barrel having one end open and one end closed, a fixed electrode carried by the closed end of the barrel and having its inner end projecting within the barrel, a plug threaded into the open end of the barrel, a terminal clamp projecting from the outer end of said plug, said plug and terminal clamp being of conductive material and a movable electrode fixedly projecting from the inner end of said plug within the barrel and adjustable relative to the fixed electrode by a relative turning of said barrel and plug.

1,006,847. Differential Gearing. James G. Heaslet, Detroit, Mich., assignor of one-half to Walter E. Flanders, Pontiac, Mich. Filed July 27, 1910. Serial No. 574,129.

1. In a differential gearing the combination of a housing member, a primary driving gear, a casing member, means for detachably securing said driving member between said housing and casing members, a stud carried wholly by said housing member, said stud being of a length equal to the diameter of said housing member, idlers mounted on said stud, axles extending into said housing member and abutting said stud, secondary driving gears upon said axle and in mesh with said idlers, and detachable means for securing said stud to said housing member.

1,006,867. Transmission Mechanism. Clarence R. Minor, Sandusky, Ohio, assignor of one-fifth to Arthur E. Merkel, Cleveland, Ohio, and two-fifths to Edward N. Hawley, Norwalk, Ohio. Filed Oct. 4, 1910. Serial No. 585,221.

1. In a transmission mechanism, the combination of a driving clutch including in its structure two members, one of which is adapted to be connected or disconnected from the other; means for effecting such connection or disconnection; a driven member frictionally connected with one of said clutch members; and means for establishing positive connection between such driven member and said connectible or disconnectible clutch member; the latter member being adapted when actuated to disengage the other clutch member, to render inoperative the means for establishing said above-named positive connection.

1,006,872. Spring for Vehicles John A. Perry, Cleveland, Ohio, assignor to The Winton Motor Carriage Company, Cleveland, Ohio, a Corporation of Ohio. Filed June 9, 1904. Serial No. 211,810.

1. A spring comprising a superposed upper and lower section, the upper section embodying a plurality of leaves superposed one on the other and increasing in length from the lowermost to the uppermost leaf, with the uppermost leaf having its ends extended considerably beyond the other leaves of said section, and curved downwardly and inwardly to a point below the extreme ends of the uppermost leaf of the lower section, the lower section of said spring embodying a plurality of superposed leaves increasing in length from the lowermost to the uppermost leaf, with the ends of the uppermost leaf of said lower section extended some distance beyond the ends of the adjacent leaf of said section, and links pivotally connected to the downwardly and inwardly curved ends of the uppermost leaf of the upper section and to the extended ends of the uppermost leaf of the lower section, said links being free to move on both of their pivotal points, and said sections of the spring being secured together centrally of their ends, with the lowermost leaf of the upper section resting upon the uppermost leaf of the lower section at the point of connection.

1,006,925. Combined Steering and Propelling Means for Vehicles. Rochus Fautsch, Chicago, Ill. Filed Sept. 21, 1910. Serial No. 583,111.

1. The combination with a wheel, of a beveled gear connected to drive said wheel, a pin adjacent said gear, a driving axle arranged below the axis of said wheel, a beveled gear on said axle, and three beveled pinions on said pin, the uppermost of said pinions meshing with the upper portion of said wheel driving gear, the lowermost of said pinions meshing with the lower portion of the gear on the axle, and the intermediate pinion being a double pinion and meshing with both of said gears, substantially as described.

1,006,989. Gas Engine. Charles T. Wade, U. S. Navy. Filed May 4, 1906. Serial No. 315,198.

1. In a gas engine, the combination of an explosion cylinder and a compression cylinder arranged in the same straight line and separated by a partition, said compression cylinder having a fuel admission inlet adjacent the end remote from said partition and closed between said inlet and partition, a piston in each of said cylinders, a single piston rod connecting said pistons, said compression piston adapted to create a vacuum in the compression cylinder on the upward movement whereby to admit a complete fuel charge when said piston uncovers the fuel inlet; said compression piston compressing the admitted charge on the power stroke of the explosive cylinder piston, and a means associated with the piston rod for admitting the compressed charge into the explosive cylinder at substantially the end of said power stroke.

1,007,010. Carburetter Attachment. Charles Schlayer, New York, N. Y., assignor of one-half to Charles W. Jacob, New York, N. Y. Filed May 3, 1910. Serial No. 559,064.

1. In a carburetter attachment an agitator arranged in the pipe between the carburetter proper and the engine embodying therein a rotatable agitating member the effective area of which is spaced away from its axis of rotation and intersecting substantially the entire area of said pipe but upon different planes, both radially and axially thereof.

1,007,015. Tire. Thomas J. Thatcher, Detroit, Mich., assignor of one-third to Frank B. Thatcher and one-third to James Gray, Detroit, Mich. Filed July 12, 1911. Serial No. 638,069.

1. A resilient tire comprising an inner and an outer series of flat spring members bent to form a tubular structure and arranged in pairs, a series of spaced intermediate flat spring members between the inner and outer series, and each member thereof arranged with its edges between the edges of adjacent pairs of members, a rivet passing through the openings in each pair of members and through an opening in the intermediate member to secure the three members together with the intermediate member free to slide between the adjacent pair of members, a wheel rim, and means for securing the ends of said spring members to said rim.

1,007,018. Vehicle Tire. Harry Wilson and Carl Guder, McKeesport, Pa. Filed July 12, 1911. Serial No. 638,106.

An automobile tire comprising a casing, a reinforcing for said casing comprising a canvas fabric body suitably disposed and incorporated within said casing, an armor fabric embedded within said casing and extending into the heel portions thereof and disposed above said reinforcing fabric, hooked portions formed on the termination of the side portions of said armor fabric, a second armor fabric embedded and vulcanized in the tire casing and disposed above the first armor fabric, said second armor fabric being V shaped in cross-section with inclined sides formed thereby to ward off any sharp point which might pierce the casing and hooped portions formed at the termination of the sides to securely anchor said second armor fabric.

1,007,032. Spring Wheel. Robert C. Jarvis, Los Angeles, Cal. Filed June 1, 1910. Serial No. 564,517.

1. In a spring wheel, a wheel having a tire, segmental springs spaced apart and mounted circumferentially upon such tire, such springs comprising a tread portion and two substantially V-shaped springs arranged between such tread portion and the tire, such V-shaped portions being provided at one end with a slot and being attached at its other end to the tread portion by a suitable fastening, and bolts passing through the slot in the V-spring and the tire.

1,007,077. Spring Suspension for Vehicles. William Everard Eastman, Boston, Mass. Filed July 14, 1910. Serial No. 572,053.

1. In an improved spring suspension for vehicles a body supporting frame having reflexed terminals at the ends thereof, turn blocks movably supported therein and provided with an adjusting screw bolt, a semi-rotatable block mounted on said bolt, a pendant lever connected to said rotatable block and means actuated by the lever to removably retain the outward ends of said spring suspension.

1,007,087. Resilient Wheel. James S. Gammon, Oklahoma, Okla. Filed July 16, 1910. Serial No. 572,238.

1. In a resilient wheel, a hub, a rim comprising sections pivoted together, spokes supporting alternate pivotal points of said rim from said hub, said spokes each comprising a portion of resilient material having its central portion formed into a curve to support its respective pivotal point of said rim, the ends of the portion of material forming said spoke being inserted into

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said hub, and means carried by the outer curved portions of said spokes to support the remaining pivotal points of said rim.

1,007,088. Vehicle Wheel. James S. Gammon, Lees Summit, Mo. Filed Nov. 21, 1910. Serial No. 593,299.

1. In a vehicle wheel, a hub, a rim, comprising sections pivotally joined, chair plates crossing the joints in the tread of the rim between the sections thereof, and resilient spokes extending from the hub and supporting said chair plates.

1,007,094. Automobile Starter. Stonewall Jackson Gill, Roanoke, Va. Filed Mar. 8, 1911. Serial No. 613,087.

1. In combination, a shaft having an arm on the end arranged with an engine cylinder and provided with a fly wheel having buckets at the other end, the engine cylinder having oppositely arranged serrated members, the arm of the shaft having sparking material thereon adapted to co-operate with the serrated members, and means for storing air adapted to be forced against the buckets of the fly wheel, thereby imparting motion to said shaft.

1,007,121. Spring Wheel. Gundet B. Livingston, Burlington, N. D. Filed Dec. 14, 1910. Serial No. 597,292.

1. A wheel including an inner rim, an outer rim spaced from the inner rim, a plurality of supporting devices spaced apart and connected to the outer rim, a plurality of supporting devices spaced apart and connected to the inner rim and located opposite the spaces between the supporting devices of the outer rim, a pair of bell crank levers connected to swing at their elbows to said inner supporting devices, springs connected respectively to the supporting devices of the outer rim and one member of said bell crank levers, and means operating upon the other member of the bell crank levers to control the tension of the springs.

1,007,150. Fender for Automobiles. William Snyder, Rochester, N. Y. Filed July 8, 1911. Serial No. 637,482.



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1. The combination with a wheeled vehicle, of a fender having a swinging portion, a swinging operating member supported on the vehicle and having two arms, lying at opposite sides of the vehicle, and links connecting said arms and swinging portion of the fender.

1,007,170. Starting Device for Gas or Explosive Engines. Henry O. Wurmser Lorain, Ohio. Filed Mar. 28, 1910. Serial No. 551,873.

1. In a device of the character described, the combination of an engine shaft, a clutch member carried by said shaft, a cranking pulley movable on the engine shaft longitudinally thereof, and constituting a clutch member, said pulley being provided with a collar, a coiled spring connected to said pulley and to the engine frame, a flexible member wrapping around said pulley, means for moving said pulley longitudinally of said engine shaft and means comprising a dog mounted on a stationary part of the structure, a spring arm connected to the dog and adapted to bear against the face of the collar carried by said pulley and bring the dog into engagement with said collar for positively and automatically separating the clutch members on reversal of the engine shaft.

1,007,201. Vehicle Spring Connection. George W. Hollaway, Gilroy, Cal., assignor of one-half to Edgar A. Hollaway, Gilroy, Cal. Filed Dec. 14, 1910. Serial No. 597,348.

1. In a device of the character described, the combination of a vehicle body, a wheel, and an axle, a bow spring secured at the center to said vehicle body, a fulcrum rigidly connected with said vehicle body on one side of the point of attachment of said spring, a fulcrum movably connected with said body on the other side thereof, levers rocking on said fulcra respectively, links connecting the outer ends of said levers with the free ends of said spring, and means whereby the inner ends of said lever are pivotally connected to said axle, substantially as described.

1,007,268. Emergency Brake. Clement Clark, Sandusky, Ohio. Filed May 8, 1911. Serial No. 625,704.

1. The combination with an axle and a wheel, of an emergency brake, comprising an eccentrically mounted ring adapted to be oscillated, a pair of brake shoes operably carried by said ring and adapted to be interposed between the wheel tire and the ground, one at a time, each of said brake shoes being provided with antifrictional rollers for engagement with the tire, and means for oscillating the ring to place either one of the shoes between the ground and the tread of the wheel.

1,007,277. Internal Combustion Engine. Charles E. Duryea, Reading, Pa. Filed Oct. 28, 1910. Serial No. 589,577.

1. In a gas engine, a hollow cam shaft, a polygonal rod passing therethrough and cranks carried by said rod adapted to actuate the igniting mechanism, in combination with a sliding sleeve on both the cam shaft and said rod and arranged to vary the position of said rod in its angular relation to said cam shaft when said sleeve is shifted longitudinally with relation to the cam shaft.

1,007,313. Automobile Suspension. Ernest Schorr, Detroit, Mich. Filed Nov. 25, 1910. Serial No. 594,006.

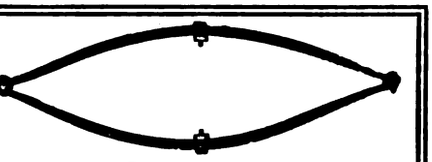
1. In an automobile, a frame, a body above the frame, rock arms oscillatory on the frame for supporting the body, a differential reduction gear train operated by each arm, and a resilient shock absorbing means to which each train is connected, that is supported independently of the frame of the body.

1,007,331. Double-Acting Two-Cycle Internal Combustion Engine. John E. Brown, Sarnia, Ontario, Canada, assignor of one-half to Luke W. Turnbull, Port Huron, Mich. Filed June 3, 1907. Serial No. 376,907.

The combination of a cylinder adapted to explode a charge at each end, a hollow reciprocatory piston therein, said piston having ports near the ends thereof, the wall of the cylinder having by-passes therein which open into the cylinder at each end, said by-passes adapted in conjunction with said ports to establish communication between the interior of the hollow piston at its ends and the ends of the cylinder, the movable piston in its travel alternately opening and closing both ends of said by-passes, a stationary piston within the movable piston, said stationary piston having a chamber located centrally therein and having valve-controlled ports opening through the opposite ends thereof which connect the chamber of the stationary piston with the interior of the movable piston on each side of said stationary piston, and a hollow rod passing through one end of the cylinder and through one end of the movable piston, said hollow rod supporting the stationary piston and communicating at one end with the chamber therein independently of said valve-controlled ports.

1,007,375. Resilient Wheel. Frank Morris, Omaha, Neb. Filed Feb. 21, 1911. Serial No. 609,882.

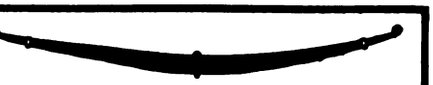
1. In a resilient wheel, a hub, a series of pockets radially disposed about said hub, a foot member disposed in each of said pockets, a pneumatic tire carried by said foot members, and an outer rim encircling said pneumatic tire, said rim being in spring engagement with said hub.



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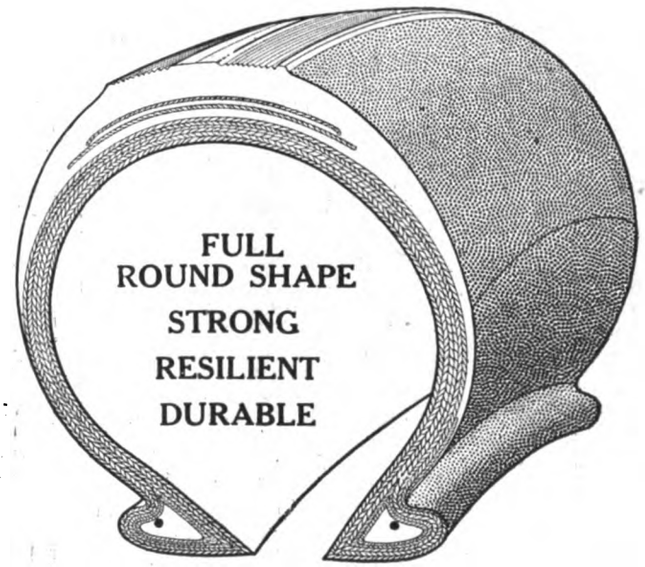
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BROKEN CRANKSHAFTS, cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

SCORED CYLINDERS repaired, $12 each. No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. Better investigate and save money. References, testimonials, and full details on request. WATERBURY WELDING CO., Waterbury, Conn.

SALESMEN, one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. STURDY MFG. CO., 2637 Michigan Ave., Chicago, Ill.

GAS ENGINE Troubles and Installation, cloth, $1.00; flexible leather, $1.50. Automobile Troubles and How to Remedy Them, cloth, $1.00; leather, $1.50. Eight other practical and reliable mechanical books. Send for circular. CHAS. C. THOMPSON CO., Dept. B, 1126 S. Wabash Ave., Chicago.

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WANTED—First class man thoroughly posted on Automobile Sundries—one competent to manage Sundry Department for large firm. Give reference, age and salary wanted, and past experience, which will be treated confidential. Address OMAHA RUBBER COMPANY, Omaha, Neb.

WANT a Stanley steamer, model 60, any condition. F. L. RICH, 3 George St., Roxbury, Mass.

FOR SALE—Five-passenger touring car. Inquire OPERA HOUSE, Ft. Madison, Iowa.

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THE BUSH MANUFACTURING CO.
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ALL SIZES ALL STYLES $1 Porcelain or Mica
Emil Grossmann Co. New York and Detroit
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For Motor Trucks
Jencick Motor Corporation
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Mosler Spit-Fire Are The Best

$495.00 METZ 22 H. P. MOTOR CAR
The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.
METZ COMPANY, Waltham, Mass., U.S.A.

INVADER OIL
"The Best the World Affords"
CHAS. F. KELLOM & CO.
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MOTZ Cushion Tires
For Pleasure Cars and Light Delivery Cars
Send for Booklet 58
THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio
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Distributors for New England States
A—Shows double, notched treads.
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THE SPRINGFIELD TOP
(Pat. 1895)
SPRINGFIELD METAL BODY CO.
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Thomas
TECHNICAL SERVICE for THOMAS OWNERS
E. R. THOMAS MOTOR CAR CO.
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Automobile Tires

The average mileage of Kelly-Springfield Tires is higher by a thousand or two than the average tire's average mileage. And mileage is the most important thing you buy in tires.
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Press the Lever and It's Tight
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The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you **cannot prevent skidding** or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with **Weed Chains.**

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them **on the front wheels too.**

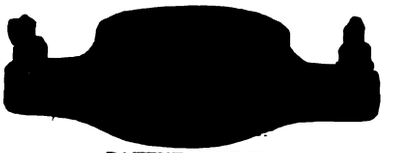
For your own safety—for the safety of the public, **fully equip** your car with **Weed Chains.** Make it **your business** to get a set today.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
28 Moore St. New York

The Name "Weed" on Every Hook

It's Easy to Repair the Inner Tube
if you have the
Imperial Vulcanizer Repair Kit



PATENT PENDING
Nickel Plated

One ounce of gasoline and a little specially prepared rubber—with these and The Imperial you can have practicalily a

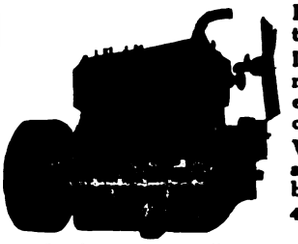
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Price $3.50 Complete

At your dealer's, or sent by express.
Guaranteed to Satisfy
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Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders 20 to 60 H. P.

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FACTORY REPRESENTATIVES;
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L. D. Bolton, ... 1810 Ford Bldg., Detroit

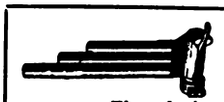
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GARAGE MODEL repairs three tubes and two casings at a time. Cheapest and best on the market. Get our special selling plan. Portable model for individual owners which will please your customers. List price, $12. Manufactured by

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They don't sell on sight, but
They do sell on sound.
Write for prices and circular.
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Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.

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will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
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Cut out the everlasting repairing!—the agony of punctures, blowouts, and delays Enjoy unrestricted pleasure—always, always—with
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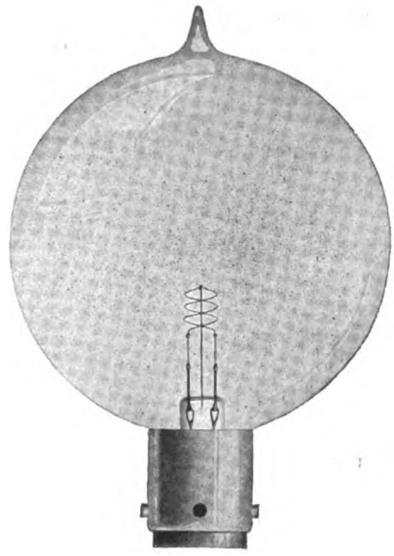
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You also want lamps that give you the brilliant white light characteristic of all Mazda lamps and in addition you want them to stand vibration without breaking and to burn up to full candle power without excessive current consumption.

One lamp will do all these—You can be sure of getting this lamp if you



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which is found on the bulb of every "Federal" Mazda.

Dealers who count satisfied customers as their best business asset are carrying Federal Mazdas regularly in stock.

And they are making more money because each lot of lamps is uniform with former lamps and customers come back for more when once they have used "Federals."

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Tens of thousands of car owners in Europe have proved by thorough experience that a pair of

"J. M." Shock Absorbers

on the rear springs produce utmost comfort at high speeds, *increase* engine efficiency, and *reduce* tire expense. *Why?*

Because the "J. M." Shock Absorber is an unique, perfect supplement to the rear springs of the car, which makes the rear wheels hold the ground so perfectly, despite rocks, ruts and car tracks, that there is an increased continuance of traction otherwise impossible.

Because of the thorough manner in which the "J. M." holds the rear wheels to the road, avoids the "racing" of your engine when the weight is taken off the rear, or driving wheels—and eliminates absolutely the tire grinding and engine shocks which result from the rear wheels jumping the ground one instant, and hitting it with a thud the next.



Because the springs that compose the "J. M." are so scientifically planned and constructed that they absorb the 20 to 30 vibrations per second which is required for high speeds on rough roads—producing comfort that is possible by no other means.



Do not confuse the "J. M." with rotary friction shock absorbers. Before you equip your car investigate—find out how the "J. M." is different, why the "J. M." is superior.

Made in three models—attachable in an hour, detachable in a quarter hour. **Prices, $35.00 to $50.00 per set.** Write for booklet "W" with full information and liberal agency proposition.

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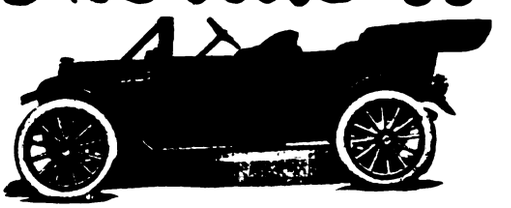
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THE phenomenal records made by the "Dreadnought" Moline "35" in winning four great Glidden, Reliability and Economy Tours in the past two seasons have left an impression of "quality" that is publicly recognized wherever and whenever you drive the MOLINE—the car with the famous

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Write for Catalog, Edition de Luxe, showing the four new Foredoor Self-Starting Models—Five-Passenger Touring, Four-Passenger Roadster and Two-Passenger Roadster.

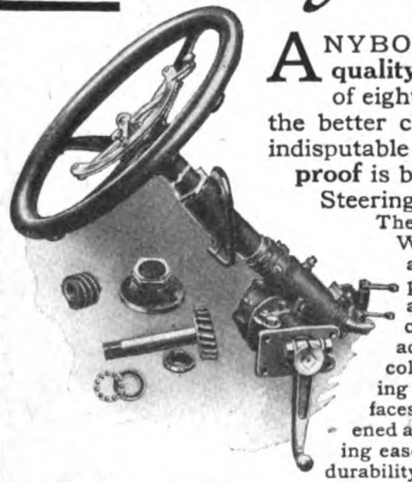
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Warner Quality
Steering Gears



ANYBODY can claim quality—but a record of eight years use on the better class of cars is indisputable proof. That proof is back of Warner Steering Gears.

The prime features of Warner Gears are: accessibility; complete interchangeability; use of eccentric sleeves; adjustable angle of column; large bearing and contact surfaces specially hardened and ground, assuring ease of motion and durability.

The Warner line includes a wide range in both pleasure and commercial types.

We guarantee dependable deliveries.

Get acquainted with Warner Quality—make it another selling argument.

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TIRES

(Guaranteed 5000 Miles)

Mean a Saving of 30%

The attention of car owners all over the country has been attracted by the remarkable showing of AJAX TIRES.

Their record for service and durability in the 1911 Glidden Tour has never been equaled by other tires, and proves conclusively that the Ajax are the Leading Quality Tires for Touring.

Tires that make record trips and finish almost as good as new are the tires dealers find a profit in handling.

Wherever endurance contests have been held under actual touring conditions, AJAX TIRES have proven strongest and sturdiest.

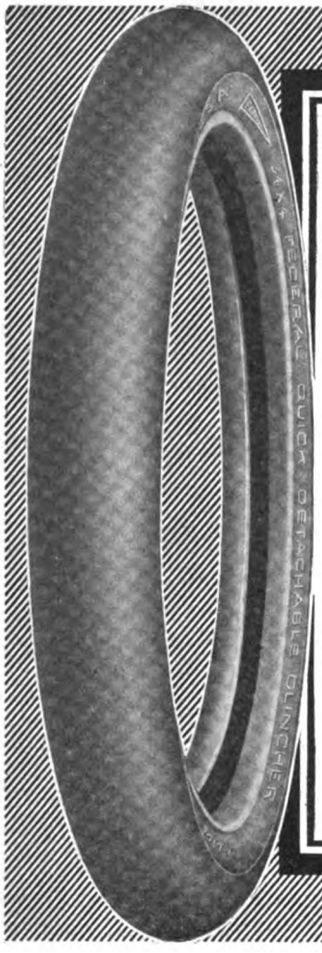
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MEASURED on a mileage basis Federal Tires are the most economical tires you can buy. They last longer and give more service than other tires, yet cost no more than any high grade tires.

High quality in the materials used, and perfection in the making, are reasons why Federal Tires occupy this position of supremacy. Tire users who know recognize them as the tires of "Extra Service."

Federal Tires are made in *Rugged Tread* (non-skid) and *Round Tread* types, for all standard rims

Federal Tires are supplied by leading dealers. Write for interesting tire book.

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MILWAUKEE

Branches and Agencies: *New York, Chicago, Kansas City, Minneapolis, Denver, Indianapolis, Columbus, St. Louis, Louisville, Omaha, Houston, San Antonio, Little Rock, Atlanta, Los Angeles, San Diego, Pasadena, New Orleans, Portland.*

THINK THIS OVER

very carefully and read it twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly—tuned up to its highest power. Perhaps the valves pit—warp—go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

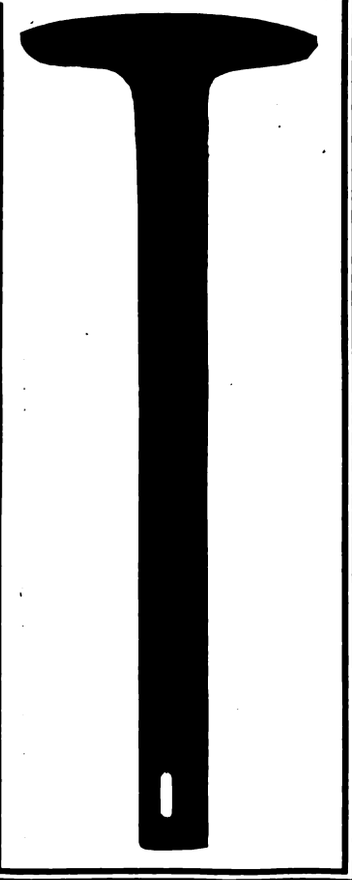
You cannot slight this part by putting in an inferior product—valves that will give trouble, or even break from inexperience in their manufacture—valves of unsuitable material, not suitably heat treated.

Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

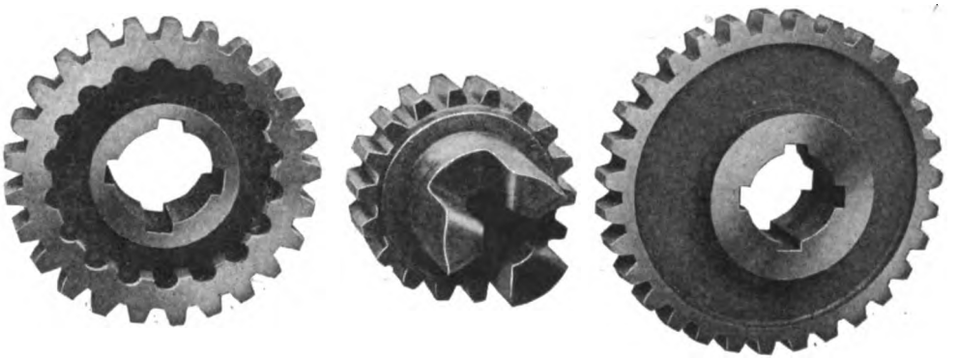
Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

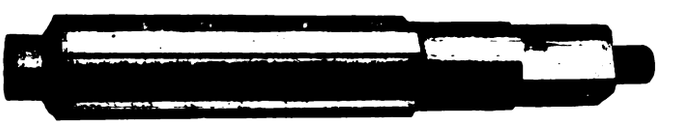
THE ELECTRIC WELDING PRODUCTS COMPANY
CLEVELAND, OHIO



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GRANT-LEES GEARS





Pioneer Helical Gear Makers of America

The Grant-Lees Machine Company

CLEVELAND, OHIO

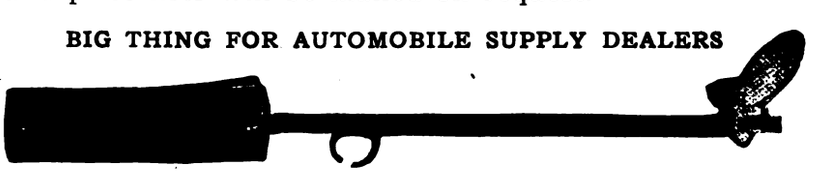
The Reflex



An Inspection Light That Locates Trouble with the Least Trouble

MOTORISTS who have learned the trials and inconvenience of **crawling under** the body of the car to locate trouble will gladly welcome the advent of the "REFLEX"—the Inspection Light that will reach into the innermost recesses of the Motor, etc., and show, clearly, all sides of the object at one glance. It gives a powerful light without danger of explosion, without smoke or soot. It has done away with the dangerous match and candle. Can't blow out; costs little more than the ordinary pocket flash light. Our circulars and price lists will be mailed on request.

BIG THING FOR AUTOMOBILE SUPPLY DEALERS

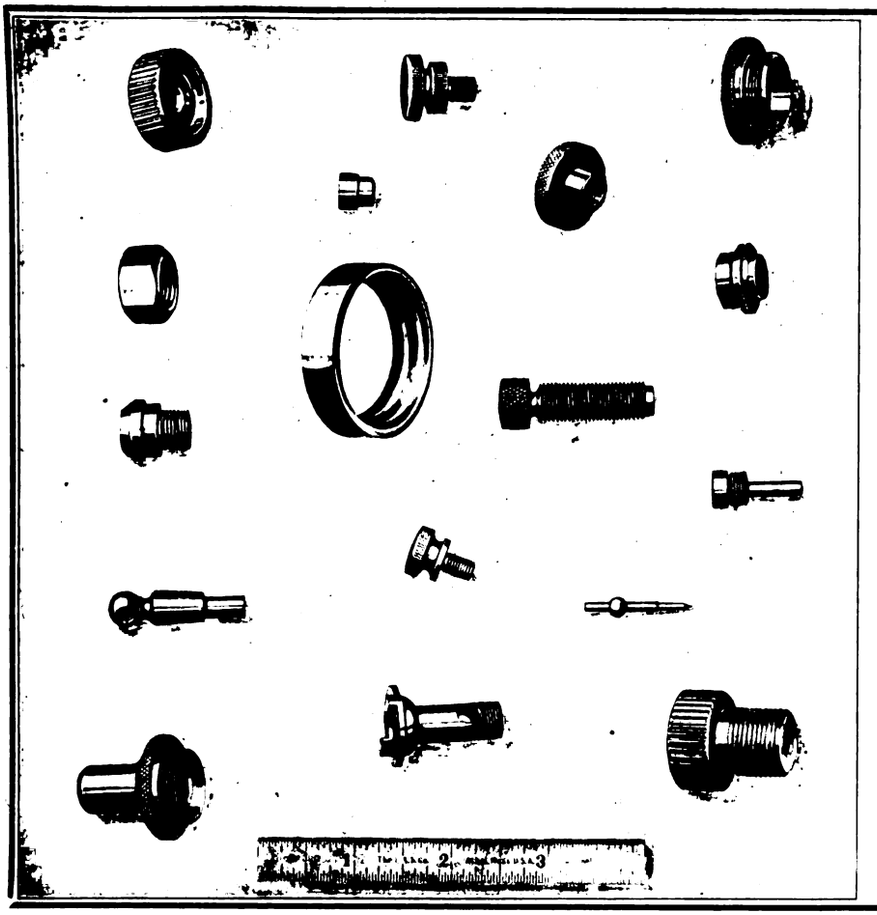


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SOLE SALE RIGHTS FOR UNITED STATES

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Milled Carburetor Parts

HERE are a few of the parts we make for manufacturers of automobile accessories and automobiles.

These were made to the specifications of most particular users. The product is necessarily accurate and smooth; and good deliveries are also an attractive item of NAMCO Service.

From your samples and drawings we will quote you a delivery and price, consistent with the satisfaction experienced by users of over two million NAMCO parts last year.

May we send you the "Gray Book," showing over two hundred special parts?

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Automatic Screw Machinery and Their Products

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The Most Practical Chain for Motor Trucks

Because the "Whitney" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened or repaired without the use of any special tool. This is of great advantage to truck builders, owners and drivers.

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"Whitney" Chains Are Built for Strains

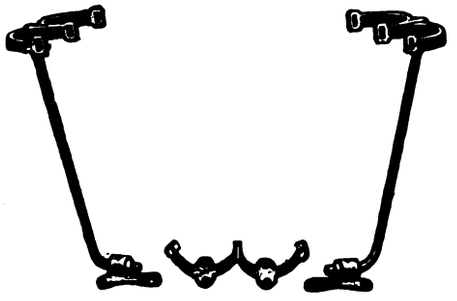
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"Torpedo" Tire and Demountable Rim Holders



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Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

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Price, complete with Straps...	$4.00	$3.00

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Cannot Short Circuit Under Severest Conditions

POSSESSING strength and durability heretofore unknown, they are positively trouble proof. Pitting of the electrodes is eliminated and uniform sparks delivered at all times. Unaffected by moisture and soot proof. The mica washers, compressed under great pressure, cannot loosen, and form an indestructible insulation.

They are the only plugs in the world that give perfect service. Practically all racing cars are equipped with them.



Single Pointed $1.00 — Double Pointed $1.10

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Catalog on our full line of ignition specialties on request.

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Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

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Diamond Tires

We could build them cheaper *But We Won't*

We would build them better *But We Can't*

THE minute you begin to sell Diamond Tires you begin to profit by Diamond prestige, not only in your tire business but in your other departments.

¶ It is worth a great deal to be known as a Diamond dealer and we will help you make yourself known quickly and effectively.

¶ The services of high priced advertising men embodied in copy and cuts for all sorts of advertising are furnished to Diamond dealers without charge.

¶ In every way the Diamond policy is co-operation. Our interest in you is not governed by the number of tires you sell. Diamond service to dealers is as good as we know how to make it and it is the same to every dealer.

If you are not getting our little magazine for dealers you're missing something you don't want to. Send in your name today.

The Diamond Rubber Company
Akron, Ohio

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BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

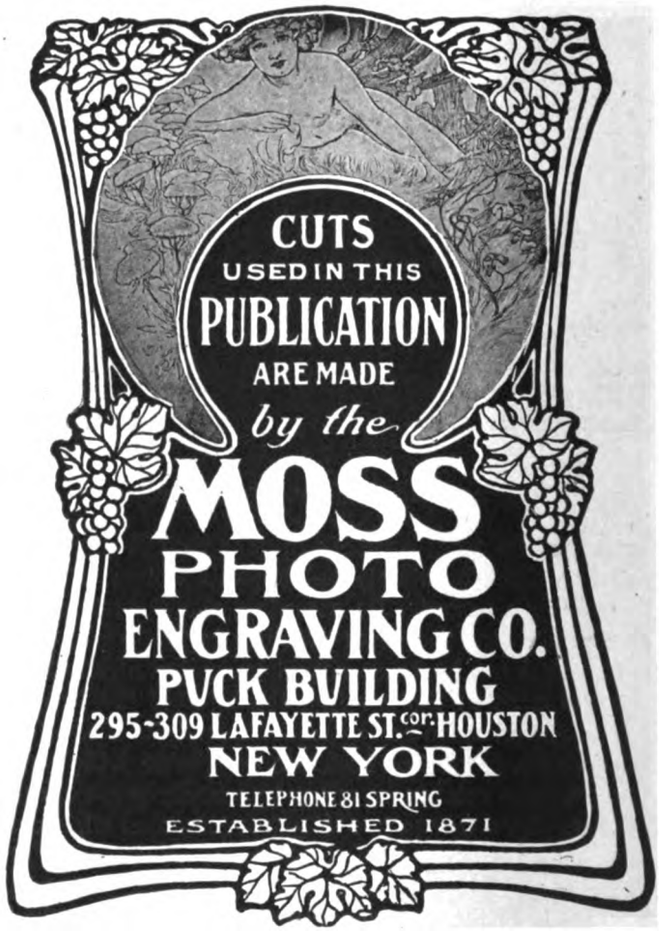
QUALITY DURABILITY
One, Two and Three Ton Capacity

LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

Reliable Agents: Secure Your Territory for 1912 at Once.

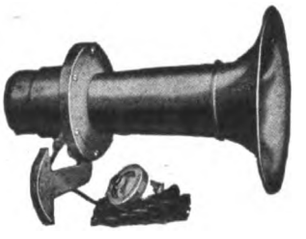
THE LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

Branches and Agencies:
BOSTON—David Abrams, 131 Portland St.
NEW YORK—West Side Garage & Motor Co., 160-162 101st St.
CHICAGO—The Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
NEWARK, N. J.—Merchants Motor Car Co., Essex Building.
DETROIT, MICH.—Bierl Auto Truck Sales Agency, 453 Dix Ave.
DISTRICT OF COLUMBIA AND VICINITY—Bowles Motor Sales Co., Inc., 1608 14th St. N. W., Washington, D. C.



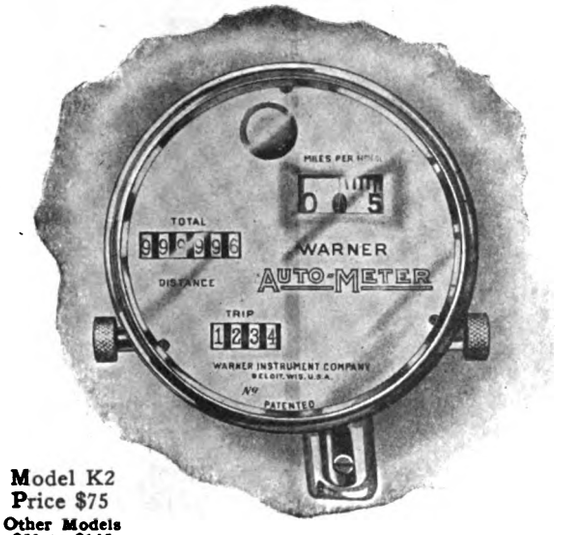
"AC"

This name stands for efficiency in
SPARK PLUGS
Used as standard equipment by seventy-four prominent manufacturers.
CHAMPION IGNITION COMPANY. Flint. Mich.



Put a
NEWTONE
On Your Car
Price $20 Complete with Button and Cable
The Best Warning Signal on the Market
"The Mile Away Motor Horn"
Insures
EFFICIENCY and ECONOMY
Let Us Send You One on Approval
AUTOMOBILE SUPPLY MANUFACTURING COMPANY
220 Tuffle Place Near DeKalb Avenue BROOKLYN

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Model K2
Price $75
Other Models
$50 to $145

WARNER
AUTO-METER

"The Aristocrat of Speed Indicators"

AUTO BUYERS are now insisting on complete cars. A good car is not complete without a Warner on it. It is the only speed indicator of even quality with a high grade car.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

Branches at

Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
Boston	Cincinnati	Detroit	Los Angeles	Pittsburgh	Seattle
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BOSCH

Equipped, the Fiat, with Tetzlaff driving, now holds the World's Road Record.

The Fiat and Benz that followed the winner also used the Bosch.

Magneto and Plugs
—Of Course

J.I. CASE THRESHING MACHINE CO.

HIGH CLASS ENGINES AND THRESHING MACHINERY.

HOME OFFICE and FACTORY RACINE WIS

NEW YORK BRANCH 1680 Broadway
O. A. LEWELLEN Branch House Manager

New York, N. Y. March 27, 1912.

Rery Electric Co.,
1926 Broadway.
City.

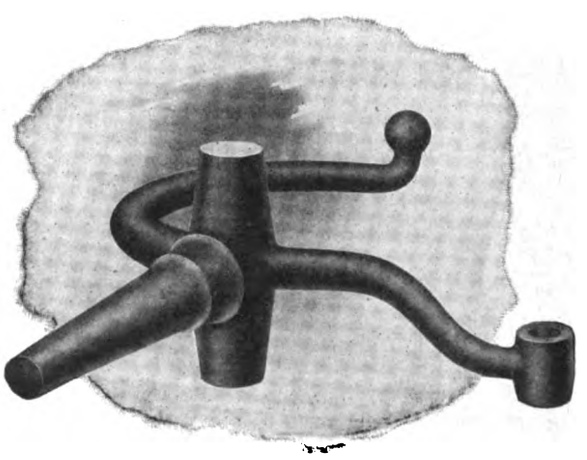
Gentlemen:-

It affords us pleasure to testify to the efficiency of your service department, your evidentelly increased desire to see that the Rery magneto gives satisfaction to customers, backed by your ready support in overcoming complaints and making adjustments cannot fail to rapidly establish the Rery magneto in the confidence of most manufacturers and owners of automobiles.

Yours truly,

J. I. Case Threshing Machine Co.
O. A. Lewellen
Branch House Manager.

A postal will bring scores of letters like these from Rery Electric Co Anderson, Ind.



PIONEERS
in making and treating
Drop Hammer Forgings

We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

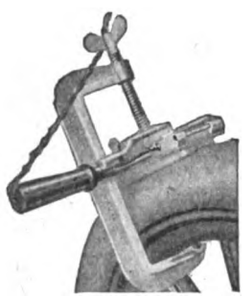
THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

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Before a customer kicks about tire trouble

tell him how a reliable vulcanizer will help him avoid it. Show him that sealing stone-cuts and sand-pockets with welds of new rubber will make tires give double or treble their usual service. Prove to him that he or his chauffeur can vulcanize tubes and casings at home. Then sell him a

SHALER Vulcanizer



Most motorists know the Shaler by reputation and will buy their vulcanizers from the local dealer who is ready to supply them. Other motorists will buy as soon as they see how well their neighbors are satisfied.

Models for every require ment—heated by electricity steam, or by direct radiation —have the exclusive Shaler feature, a thermostat to control the heat automatically. Can not injure a tire.

Write today for dealers' proposition.

C. A. SHALER CO.

405 Fourth St. Waupun, Wis.

Self HANNA Starter

The superior of any self starter ever dreamed of. The only 100 per cent. efficient self starter on the market that will not soot and foul your plugs.

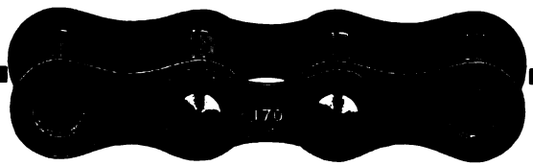
The one self starter that scientifically and accurately measures your acetylene gas and then mixes it with air in your cylinders. Price $35.

J. H. VALENTINE COMPANY, Syracuse, New York

The Valentine Manifold Starter and Gas Lighter is the equal of any manifold self starter on the market. None so simple. None so practical. And none so low priced.

The electric gas lighter alone is worth the cost of both. Most lighters on the market sell for more than the Valentine starter and Lighter combined.

$10 The Valentine MANIFOLD STARTER and Gas Lighter



DIAMOND CHAINS

are and have been the recognized quality standard for 20 years. Strong, accurate and durable. Let us cut your sprockets.

DIAMOND CHAIN & MFG. CO.

150 W. Georgia St. Indianapolis, Ind.

Capacity 8,000,000 feet per year.

Raybestos REG. U.S. PAT.

LOOK FOR THE TRADE-MARK

Every foot of RAYBESTOS is stamped with our trade-mark. This protects you and your car. Be sure your brakes are lined with

TRADE MARK **Raybestos** REG. U.S. PAT. OFF.

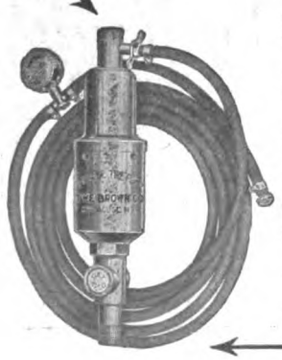
It has the highest coefficient of friction. Made of asbestos, woven with copper wire. Heat-proof, oil-proof, gasolene-proof, and as for water—it has absolutely no effect on this lining.

THE ROYAL EQUIPMENT COMPANY

436 Housatonic Ave. BRIDGEPORT, CONN.

Manufacturers of Duplex and Raymond Brakes and Gyrex—The Mixer.

FOOL PROOF, SWEAR PROOF, WEAR PROOF



Fool Proof—Because it has no complicated mechanism, only one moving part. Can't get out of order.

Swear Proof—Because it relieves you of the dirtiest and most disagreeable feature of automobiling.

Wear Proof—Because it is made of the best materials in the most careful manner.

Not a luxury but a NECESSITY if you want your tires to give good service.

Price $15.00 including 12 feet of hose, HIGH GRADE RECORDING GAUGE AND SELF OPENING VALVE CONNECTION.

Start the season right—ask your dealer or write us today.

THE BROWN CO., 1025 S. Clinton St., Syracuse, N. Y.

Price

$20

Without Cylinder Attachments

The "Crankless" STARTER

By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.

Guaranteed by our 40 years standing and reputation.

COX BRASS MFG. CO. Established 1872 **Albany, New York**

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WINTON SIX

Quality Highest: Price Lowest

On highest car-quality, the Winton Company undersells competition, because our "overhead burden" is lightest. Our booklet, "Let's Count the Cost," tells facts worth money to you. Shall we send you a copy?

THE WINTON MOTOR CAR CO.

426 Berea Road **Cleveland, O.**

The World's First Maker of Sixes Exclusively

Empire Twenty-Five

The Little Aristocrat

This is the Big Brother of the Famous Empire Roadster and is a **small edition** of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.

224 Massachusetts Street **Indianapolis, U. S. A.**

Oakland

The Car with a Conscience

All Four Cylinder Models

$1200 to $3000

30, 40, 45 Horse Power Ratings
Limousines, Touring Cars, Coupes and Roadsters

WRITE FOR CATALOGUE

OAKLAND MOTOR CAR CO.

250 Oakland Ave., **PONTIAC, MICH.**

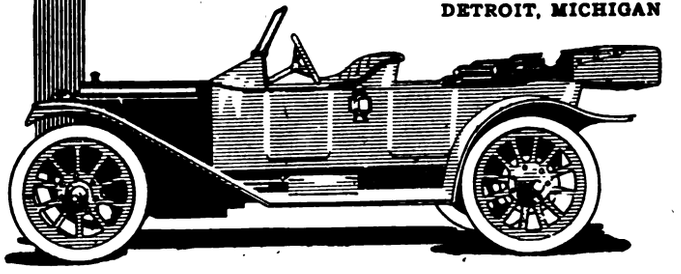
KING

Next year nearly every car will have center control—the King enables you to give it to your customers NOW.

With Full Equipment, Including Self-Starter, **$1565**

Terms, territory and detailed description on request

KING MOTOR CAR CO., 1314 Jefferson Ave., DETROIT, MICHIGAN



Hupmobile

Long-Stroke "32" Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

20 H. P. Models

Runabout—$750

F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

Roadster—$850

F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100

F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Electric headlights, electric and oil side and tail lamps, folding dash seat for third person. Rear tires, 31 x 3½ inches. With 110 inch wheelbase, $1150.

HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

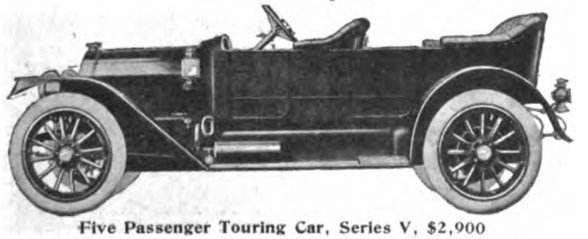
"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY

222 N. George Street **YORK, PA.**

National 40

Stock Champion

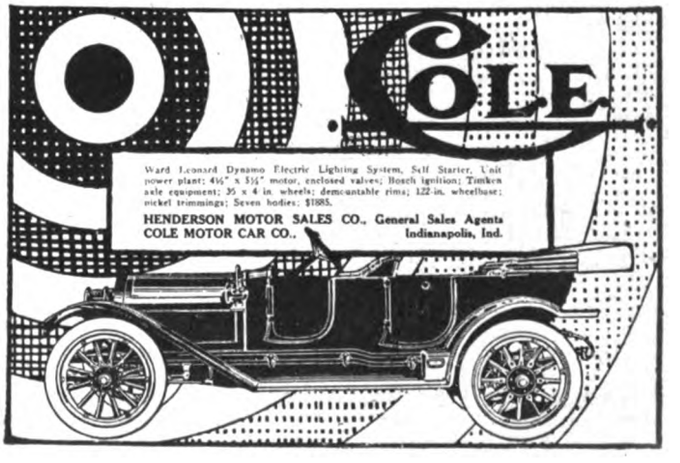


Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY

1007 E. 22nd Street **Indianapolis, Ind.**

COLE



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Aplco **Electric Lighting Systems**

are free from troublesome details, contain more up-to-date features and give more perfect results than others because of our years of experience. We have learned the lessons other makers have yet to learn and our product is proportionately better. Send for catalog.

APPLE ELECTRIC COMPANY
18 N. Canal Street
DAYTON, OHIO, U. S. A.



Ford
THE UNIVERSAL CAR

Its lightest—rightest—most economical—that's the reason we'll make seventy-five thousand of them this year. Prices $590 to $900. Agencies everywhere.
Ford Motor Company Detroit, Mich.

ANNOUNCEMENT

Pleasure Cars	- 7 Models	$850 to $3500
Delivery Cars, Trucks	- 4 Models	

Now Closing 1912 Contracts

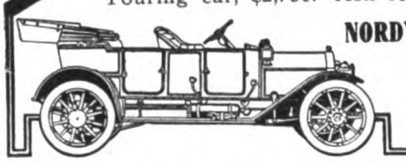
PETREL MOTOR CAR COMPANY
2530 First Avenue Milwaukee, Wis.

The Easiest Riding Car in the World

MARMON

INTERNATIONAL CHAMPION

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

1912 WRITE FOR AGENCY TODAY

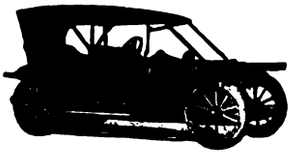
This Year it's the Glide 36-42

ANYONE who will take the time to investigate the merits of the $1550 "Glide" and compare it with cars costing $1000 more and over, can prove for himself why the "Glide" is best. Send for handsome book and learn of the

5 to 7 Years' Service

—read of the mechanical perfections, the comfort features, appearance, style and guarantee back of the "Glide"—and you will become a "Glide" owner, also. Dealers write for select territory now open. Get FREE book and ask for our proposition. Write today.

THE BARTHOLOMEW COMPANY, 220 Glide Street, PEORIA, ILL.



The American Underslung

WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

American Motors Co., Dept. E, Indianapolis, Ind.

Knight
THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta Minneapolis and San Francisco

cartercar

Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.

CARTERCAR COMPANY, Pontiac, Michigan

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COVERT Transmissions

for commercial cars have always proven successful.

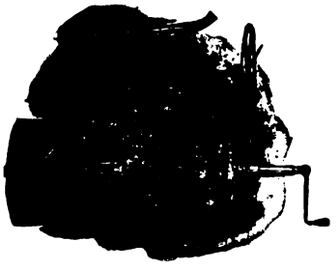
They will stand the severest tests and all we ask of you is to let us demonstrate this fact on your own car. Your inquiries will be given every consideration.



COVERT MOTOR VEHICLE COMPANY

Sales Offices:
Ford Building, Detroit, Mich.

Factory: Lockport, N. Y.

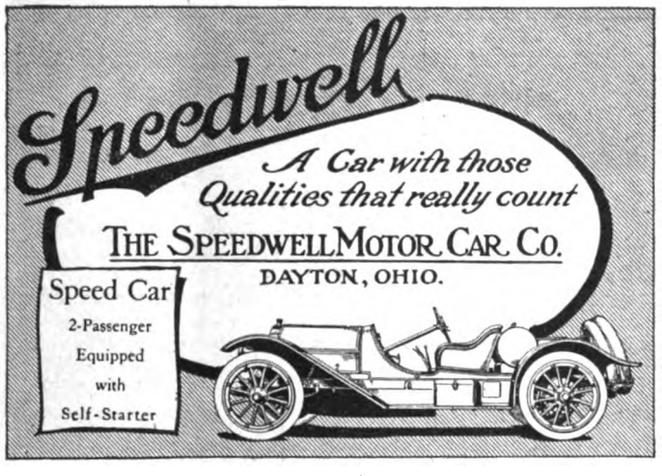


The car at the front end of the rope is always the car that carries

THE RUTENBER MOTOR

That is how many of the leading automobiles won their reputations.

THE WESTERN MOTOR COMPANY, Marion, Ind.



The Motor Lamps with Distinctive Features

There are no other motor lamps on the market with the advantages of Solar Lamps. Solars are always exclusive in style and in quality. They are the strongest lamps as well as the most effective.

In no other lamps can you obtain the Solar Special Short Focus Lead Glass Lens Mirror Reflector—the patented system of double ray light projection which gives two distinct fields of light for town and country use—or the new and exclusive black finish with a metallic lustre which is unaffected by heat or moisture. All of these features are exclusively "Solar."

Do not equip your car or specify equipment to the maker until you have seen all of the Solar advantages. See Solars at any live dealer's or write for the catalog.

Solars are made in all styles for oil, electricity, gas and in combinations.

Solar Lamps

BADGER BRASS MANUFACTURING COMPANY

Kenosha, Wis. (137) New York City

Mais Motor Trucks

Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

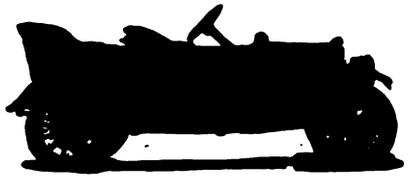
Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.



Marion

The Dealer's Car for 1912



Our Advance Catalog Tells Everything

MARION "35" Five Passenger Touring Car	$1285
Marion "33" Roadster	1150
Marion "46," "47," "48"—two, four and five passenger	1750

THE MARION SALES CO., Indianapolis, Indiana

Repair Parts For MORA Transmissions

We have in stock all parts for the transmissions of MORA automobiles. Write us for prices on any parts you may require and save money over having them made up special.

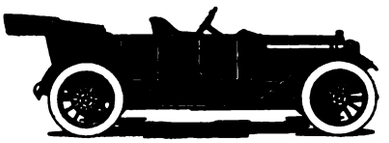
The NEW PROCESS N.P.R.H. RAW HIDE CO.

OFFICE & WORKS SYRACUSE, N.Y.

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Empire Tires
WEAR LONGEST
EMPIRE TIRE CO., Trenton, N.J.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

MICHIGAN BUGGY COMPANY, 188 Lay Blvd., Kalamazoo, Mich.

THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

K · D

The Motor With the Sliding Crescent Valve

KNIGHT-DAVIDSON
1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

The Kinsey Manufacturing Company
TOLEDO, OHIO

Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager, 1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

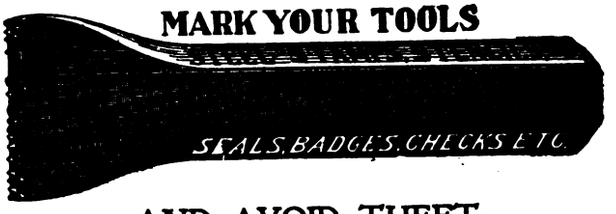
H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

Philadelphia, Pa., 1418 Blavis St.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

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MARK YOUR TOOLS

AND AVOID THEFT

Take advantage of this special offer, which lasts for 30 days: Upon receipt of cash with order we will make your stamp for 10 cents per letter. Send us your order now.

THE SACKMANN MFG. COMPANY
88-90 Canal Street AKRON, OHIO

Magneto Bargains

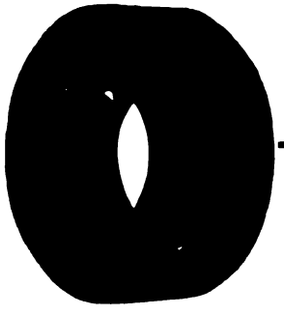
$30.00 for a $105.00 6 cylinder
$20.00 for a $93.00 4 cylinder
$18.00 for a $65.00 2 cylinder
$16.00 for a $60.00 1 cylinder

Imported U. & H. High Tension Magnetos Less Than Import Cost

Circular and Price Lists Free

J. S. BRETZ COMPANY, 250 W. 54th Street, New York

Eliminate Noise in Your Car



Use Hyatt Roller Bearings





Hyatt Roller Bearing Co.
Detroit, Michigan



Patent "Luxury" Folding Seats

Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

HODGE & GRAVES CO.,
Amesbury, Mass.

"RAJAH" SPARK PLUGS

Ignition Absolutely Sure

RAJAH AUTO SUPPLY COMPANY
BLOOMFIELD, N. J.

"K-B" KANT-BEAT Universal Joints FOR COMMERCIAL CARS PLEASURE CARS

Made from Drop Forgings and Case Hardened Throughout.

ACCURACY, RELIABILITY AND SATISFACTION GUARANTEED

Prompt Deliveries

KINSLER-BENNETT COMPANY, Hartford, Conn.
American Distributing Co., Jackson, Mich., Western Sales Agents

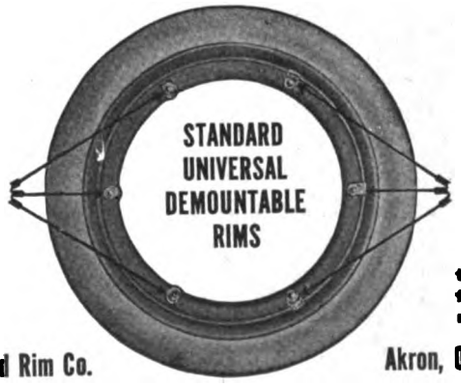
No Cranking! No Pumping!

START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

American Starter and Carburetor Mfg. Co.
2022 S. 40th Avenue CHICAGO, ILL.

Two Turns LOCKS the Rim in Place



Two Turns UNLOCKS the Rim for Demounting

The United Rim Co. Akron, Ohio

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FIAT

"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 8 Cylinder 50 H. P. $5500

(Completely Equipped)

The Fiat Agency Policy Is One of Permanency

POUGHKEEPSIE F.I.A.T. NEW YORK

The Electric Car of Quality

THE COLONIAL

Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

COLONIAL ELECTRIC CAR COMPANY

Detroit, Michigan

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS SIX — HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

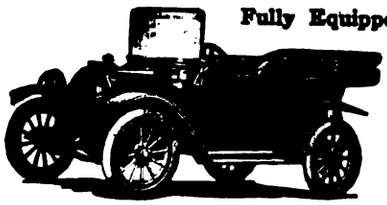
Full specifications sent on request.

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

BRIGGS-DETROITER CO., 449 Holbrook Ave. Detroit, Mich.

NEW YORK · PENNSYLVANIA · MASSACHUSETTS · WASHINGTON · DELAWARE · COLORADO · WISCONSIN · OREGON · KANSAS · DAKOTA · ALABAMA · NEBRASKA · IDAHO · VERMONT

The Only Complete Car

Electrically Self Started and Lighted

Inter-State

Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
Model 41—4 Passenger Demi Tonneau.
Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke, 40 H. P. $2400

Model 50—7 Passenger, Fore Door Touring Car.
Model 51—4 Passenger Demi Tonneau.
Model 52—Roadster type—all with the new "T" head 5 in. bore, 6 in. stroke motor. 50 H. P..... $3400

Model 30-A—Fore-Door, a 40 H. P., 5 Passenger Touring Car at $1750
Model 32-B—A 40 H. P. Roadster at - - - - - $1700

All fully described in our Art Catalog. Send for one today.

Inter-State Automobile Co., Dept. 0 Muncie, Ind.

Boston Branch: 153 Massachusetts Ave. Omaha Branch: 310 S. 18th St.

Abbott-Detroit 1912 MODELS

MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY

607 Waterloo Street Detroit, Michigan

Motor Car Manufacturers Since 1893

HAYNES

1912

Occupying the newest and most modern automobile manufacturing plant in America.

HAYNES AUTOMOBILE COMPANY, Dept. T-8 Kokomo, Ind.

SHAWMUT TIRES

SOLD EVERYWHERE **SHAWMUT TIRE CO., Boston, Mass.**

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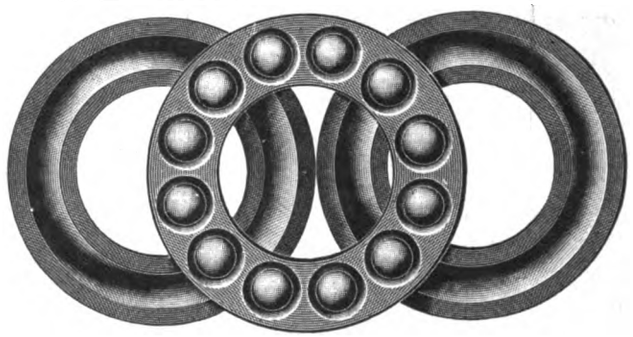
You Need
Speedo
IT'S GUARANTEED
Price
$3.50
With
Decarbonizer
High Power
Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

INTERNATIONAL ACCESSORIES CORPORATION
Chicago Branch, FULTON-GRUBB CO., 1180 Michigan Blvd.

WE MAKE THE BEST



BANTAM ANTI-FRICTION CO., Bantam, Conn.

Bower Roller Bearing Co.
DETROIT, MICH.
Manufacturers of High Grade
ROLLER BEARINGS
For All Purposes



Our Consulting Engineering Department is always at your service.
Send for catalog, price-list and specification sheets of sizes.

Better Than Commercially Perfect
GEARS
Bevel Differential
Transmission
Steering

$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

Brown-Lipe-Gear Chapin Company
H. W. CHAPIN, Gen'l Mgr. SYRACUSE, N. Y.

Cored Bars for Bushings



All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.

Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.

The Wm. Cramp & Sons Ship and Engine Building Company
PHILADELPHIA, PA.

SPLITDORF
MAGNETO
"Always There"
C. F. SPLITDORF
Walton Ave. and 138th St. NEW YORK
Chicago Boston Los Angeles
Detroit Kansas City San Francisco

Sheet Metal Stamping

WE HAVE an exceptionally complete equipment for the manufacture of special shapes from sheet metal including heavy and difficult cold drawing and forming work of Automobile and Motor Truck Parts, such as Step Hangers, Brake Drums, Axle Housings, Torque Arms, Hood Supports, etc. Send us your blue prints. Estimates cheerfully furnished.

THE BOSSERT CO., Utica, N. Y.



The superiority of
Schafer Ball Bearings
is conclusively proven by the fact that they are used in the leading cars throughout the world.

BARTHEL, DALY & MILLER
42 Broadway NEW YORK CITY

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"Buy Kline Kars First Because Kline Kars Last"

Durability, Economy, Reliability, Power and Speed make our satisfied customers.

4 Speeds Forward **KLINE KAR** Self - Starting

MR. DEALER, GET WISE—A line of high grade cars at prices that people are paying for cheap cars. Write us today.

4-30	$1700 $1750	4-40	$2200 $2250	6-50	$2800 $2850	6-60	$3300 $3500

All Models Completely Equipped.

KLINE MOTOR CAR CORPORATION, York, Pa. Factories: York, Pa. Richmond, Va.

Champion Spark Plugs

Special Designs for Every Type of Motor Made

CATALOG MAILED ON REQUEST

Champion Spark Plug Co.
TOLEDO, OHIO

Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

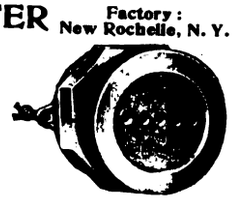
MOTT WHEEL WORKS, Utica, N. Y.
R. B. ABBOTT SALES CO., Sales Agents, Detroit

JONES HUB ODOMETER

Registers mileage. Attached to hub. Sealed so that it cannot be tampered with or disconnected without owner's knowledge. Mileage quickly ascertained—always visible.

THE JONES SPEEDOMETER Factory: New Rochelle, N. Y.

Chicago, 1430 Michigan Avenue
Boston, 109 Massachusetts Avenue
Philadelphia, 1416 Vine Street
San Francisco, 544 Van Ness Avenue
Buffalo, 852 Main Street
Los Angeles, 1229 S. Olive Street
Portland, 329 Ankeny Street
Seattle, 917 East Pike Street
Detroit, 253-5 Jefferson Ave.

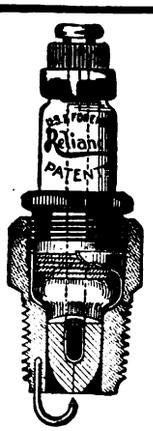


If you are interested in

FEDDERS RADIATORS

we would like to send our latest catalogue.

Fedders Manufacturing Works
57-67 Tonawanda St. BUFFALO, N. Y.



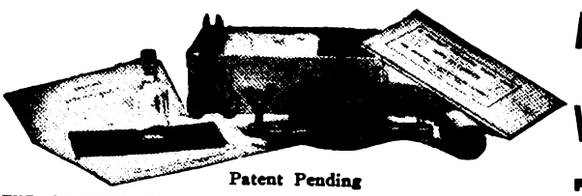
Soot and Carbon CAN'T collect on Reliance Spark Plugs, and impair their efficiency. The patented electrical action of the Reliance prevents it. Soot and carbon are destroyed before being deposited.

If you drive an automobile you want Reliance Plugs. If you build automobiles equip them with Reliance plugs and please the purchasers. You can't furnish better plugs.

JEFFERY - DEWITT CO.
65 Butler Avenue Detroit, Mich.
Largest Exclusive Spark Plug Manufacturers in the World.

WARNING

PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.

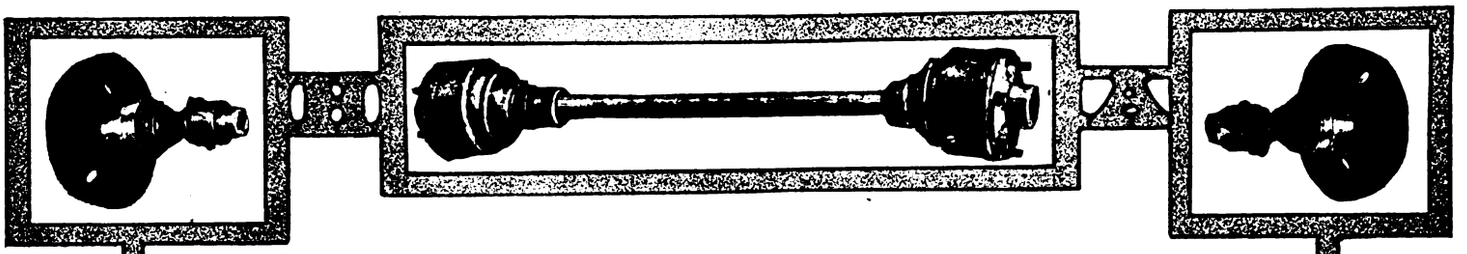


Patent Pending

ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

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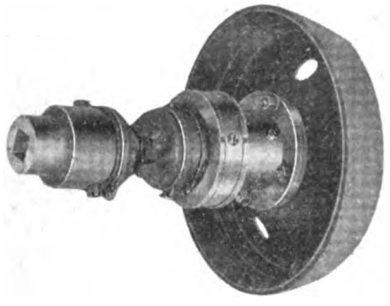


The Hartford Cone Clutch

shown here, is too well known to require detailed descriptive matter in this advertisement.

Its true worth is proved by the fact that it is part of the standard equipment of a large number of pleasure and commercial vehicles (these will be given in a later advertisement).

The Hartford cone clutch can be removed from the car as a unit without disturbing any other part. We furnish it with a double set of universal joints. The clutch itself comes in either pressed steel or aluminum, the weight being the same in both cases.



Notwithstanding that for a time the disk clutch was in high favor among manufacturers, it remains that the prohibitive cost of production of such a clutch coupled with its liability to develop inaccuracies of manufacture, warped disks, etc., has caused a reaction.

Today there is a logical return to the cone clutch, which, while not possibly as good as the disk clutch, still gives more uniform service and develops less trouble for the car user.

The Hartford cone clutch combines simplicity, accessibility and perfect action.

The prices are modestly consistent with merit.

Get into communication with us and let us give you information that will throw a new light on this car question.

J. S. BRETZ CO., New York, Detroit,
Sole Selling Agents.

CONE CLUTCHES

HARTFORD AUTO PARTS CO.
HARTFORD, CONN.

UNIVERSAL JOINTS

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EXPERIENCE — SHELDON — RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL
"Made in the Largest Axle Factory in the World"

Axle Talk—No. III

The SHELDON Axle Company has been making axles since 1866.

This, Mr. Manufacturer, gives you the benefit of an experience through all the processes of axle development— in which we have always led.

The SHELDON axle of today is the perfect creation of years of experience in tempering, heat treating, forging and finishing.

That we have succeeded, is well evidenced by the fact that constant demand for good axles and springs has forced us to enlarge our plant, from time to time, until today it stands the largest axle and spring factory in the world.

Reputation has made the SHELDON Axle factory just what it is—a reputation built over lines of experience, plus progressiveness and the utilization of the best brains, machinery and material that can be had.

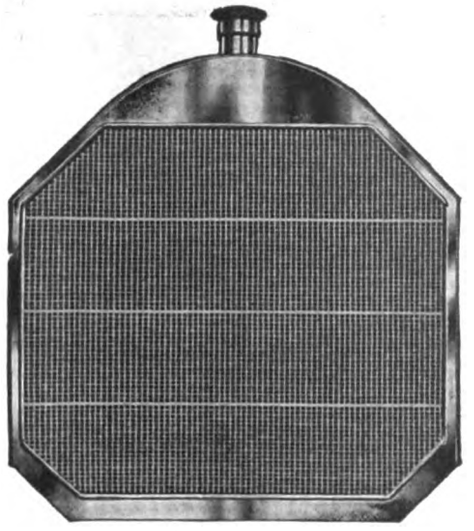
Our engineering staff stands ready to solve your axle problems. Their combined knowledge insures you correct specifications covering every phase of stress, weight, tread, road and distribution. This service is yours to command at no cost to you.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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The Mayo—the radiator thoroughbred

¶ Much depends upon the construction of the radiator for the perfect operation of an automobile.

¶ Mayo Radiators embody scientific constructive principles—our own.

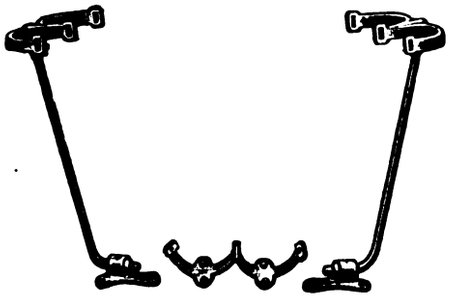
¶ Specify Mayo Radiators and note the results.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES

"Torpedo" Tire and Demountable Rim Holders



Designed especially for use on Torpedo body or Fore-door cars Set consists of two strong arms firmly bolted to running board and permitting of sufficient adjustment to accommodate two tires or demountable rims, of standard sizes, 4 inch or smaller. Made of solid Brass and guaranteed to give perfect satisfaction.

Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

	Brass	Black
Price, complete with Straps...	$4.00	$3.00

A dozen other styles and sizes in stock. See catalog.

Our 1912 Catalog, which is held as a book of reference by manufacturers, dealers and automobile owners, will be mailed on request. Circulation limited to 100,000 copies.

Chas. E. Miller

MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

HOME OFFICE

97-99-101-103 Reade St., New York City

ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

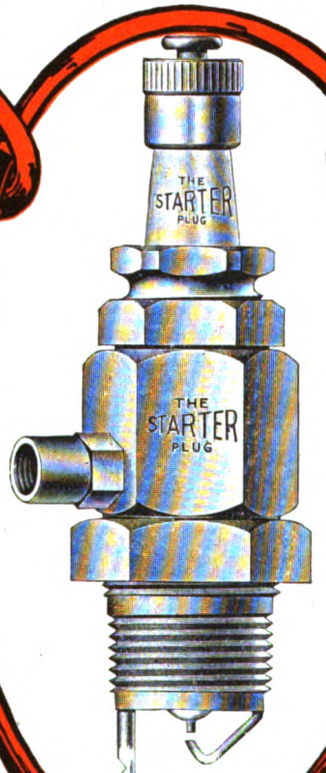
NEW YORK CITY—97-103 Reade St.
NEW YORK CITY—924 Eighth Ave.
NEW YORK CITY—2782 Broadway.
BUFFALO, N. Y.—824 Main St.
BROOKLYN, N. Y.—1421 Bedford Ave.
ALBANY, N. Y.—135 Central Ave.
BOSTON, MASS.—202-204 Columbus Ave.
HARTFORD, CONN.—274 Trumbull St.
DETROIT, MICH.—227-229 Jefferson Ave.
CLEVELAND, OHIO—1829 Euclid Ave.
PHILADELPHIA, PA.—318 North Broad St.
ATLANTA, GA.—66 Edgewood Ave.
NEW ORLEANS, LA.—601-603 Barrone St.
NEWARK, N. J.—274 Halsey St.
SPRINGFIELD, MASS.—Bridge & Dwight Sts.

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The Connecting Link

Ford — Buick — Stoddard-Dayton — Speedwell — Pope-Hartford — Elmore

The phenomenal success of the DISCO Self Starter has made an enormous demand for some method of equipping those cars which have no petcocks. Here is the connecting link—the new **starter** plug, with which Fords, Buicks, Stoddard-Daytons, Speedwells, Pope-Hartfords, Elmores, and all other cars without petcocks, are being equipped with DISCO, THE Self Starter—standard equipment for 1912 and 1913.



The simplicity of this, the new starter plug, is apparent from the illustration. The acetylene gas with which the DISCO Starter now makes cranking needless on 35,000 cars of all makes, is admitted through jet marked "A." By means of this jet the gas can be directed to secure the most efficient results, depending on the construction of the engine. It is adaptable to any type of cylinder and in any position. Can be used in connection with ANY acetylene starter.

Takes the place of all other spark plugs, and is readily screwed into place, giving the most perfect ignition results and having all the advantages, all the convenience of inspection and cleaning—and all the durability of the best spark plugs made. It is guaranteed absolutely. Patents pending.

TRADE MARK
THE STARTER PLUG
MANUFACTURED BY J.E.SCHAEFER
EXCLUSIVELY FOR
IGNITION STARTER CO. DETROIT, U.S.A.

This trademark on every box identifies the big seller and the business getter that YOU want. Remember this new Starter Plug can be used with ANY acetylene gas starter—is the only possible way of applying such starters to the certain makes of cars named above.

We always make prompt shipments; we can arrange for a few more agencies for DISCO Starters and DISCO Lighters. Write us.

To All Manufacturers, Jobbers and Dealers:

Although we control Basic Patents on this device, we will quote wholesale prices to ANY manufacturer, jobber or dealer, or will send the Starter Spark Plug prepaid to anyone at $1.50 each. Give make and year of car and give name of dealer or jobber.

Make Your Car Up-to-Date

with a Self Starter. This "connecting link" removes the last excuse for denying yourself that luxury and comfort.

DISCO

—THE Self Starter

The small illustration shows why the DISCO Self Starter can be applied to ANY car in a couple of hours by ANY manufacturer, dealer or individual. It has but 12 parts; weighs but 4 pounds, and is now for sale by our 15 branches and dealers everywhere.

IGNITION STARTER CO. Spark Plug Department
615 Dodge Power Bldg., Detroit, Mich.
Largest Manufacturers of Self-Starters in the World

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FISK TIRES

Heavy Car Type

PERFORMANCE is the Mighty Factor behind the Success of Fisk Tires (Heavy Car Type). Actual everyday service in the hands of amateur owners is the only test of merit which means anything to the average consumer.

WISE MOTORISTS, like the "Man from Missouri," want to be shown. We refer them to "*any* user of Fisk Tires" because our records show that it would be impossible for us to find a more effective demonstration of the truth of Fisk claims to tire superiority.

DEALERS appreciate this willingness on our part to submit our case to the testimonials of the actual everyday user.

Fisk Tires for Every Rim

Fisk Heavy Car Type Tires are made in every style, *to fit any rim.* All Fisk Tires are identical in construction and quality. FISK PURE PARA TUBES have a lasting quality and superlative element of economy that cannot be found in any compounded tube.

Two New Anti-Skid Tires

Dealers will find the public much interested in our Two New Anti-Skid Treads—the Bailey Tread, that has more buttons than any other on the market, and the Fisk Town Car Tread, an effective tread with an attractively substantial appearance that speaks for its non-skidding qualities. Send for literature describing these two tires.

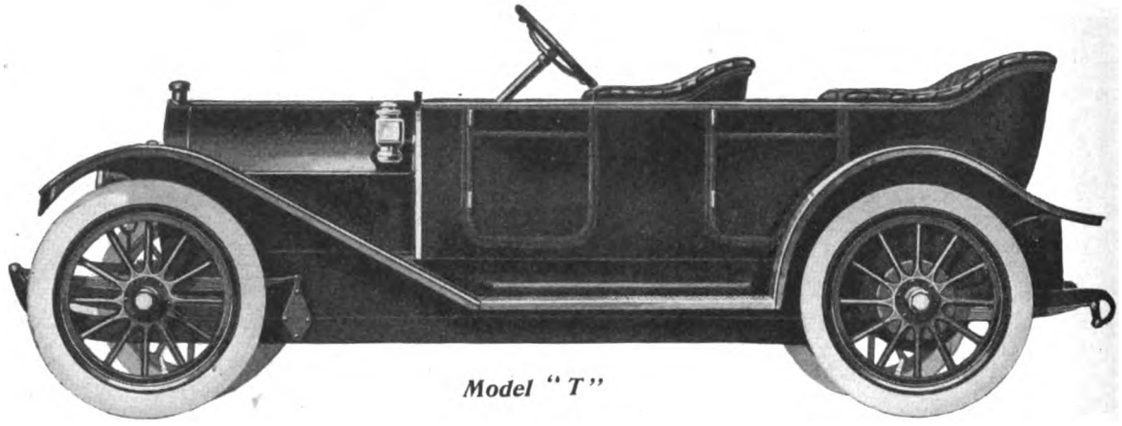
THE FISK RUBBER COMPANY

Dept. 23 **Chicopee Falls, Mass.**

35 Direct Factory Branches

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"Efficiency" In Its Relation To The Dealer Who Sells Automobiles



Model "T"

The New Regal Underslung Touring Car "25" H. P. $950

EFFICIENCY is a world slogan, everywhere men are discussing methods that shall increase results and improve products. They are not only figuring how to save labor and expense but how to make labor more profitable to themselves and their workmen. All this has a natural tendency to increase the quality of manufactured articles and to reduce the selling price to the purchaser. We have something important to say about **efficiency** as it affects dealers who sell Regal Motor Cars or who should be selling them.

EFFICIENCY IN DESIGN. Motor cars differ in design. Some are more **"efficient"** than others. We mean by this they vary in the amount of comfort they give, in the economy of upkeep they provide and in the appearance they present to the eye. But there is a car illustrated above that embodies more **efficiency** to the square inch than any other car we, as manufacturers, know of. Being an "Underslung" it is the superior in **efficiency** of any ordinary built car—more **efficient** in "Safety," in easy riding ability, in "Economy," owing to level motor suspension, a straight line shaft drive, and prevention of side-lash on springs and tires. More **efficient** in "Beauty" and "Accessibility." It is the most **efficient** car because it is an Underslung, the most advanced engineering practice in design.

EFFICIENCY IN PRICE.. The day has gone for high prices. The majority—the big buying public desires a moderate priced car. This new Regal "25" Underslung Touring Car is the most **efficient** car in the country in regard to price, because it gives **more** and costs **less** than any other car in its class. The car itself will prove it—comparison will prove it—its selling cost—$950 against its constructional quality, its powerplant, its size will prove it.

EFFICIENCY IN SERVICE. Two kinds of service—the factory service to dealers **behind** the car and the service **in** the car to purchasers. Regal Warehouses carrying supplies of cars, and supplies of every working part, are placed at strategic points all over the country for the benefit of Regal Dealers. No long waits; satisfied owners through a satisfying service is the Regal method of working **with** and **for** Regal Dealers. Then, the other kind of service this car will give owners. It will give in utility, pleasure and speed, all or more than cars costing twice as much.

EFFICIENCY IN COMPETITION. We mean business getting, car selling for dealers. The easiest car on the market to sell because it hasn't any competition. This car, at this price, with Regal service **behind** and **in** it, means bigger dividends upon your investment than any other car you drudge to sell. It adds **efficiency** to your business, a quicker turn-over, a larger volume, because it is the car the people **want** and can **afford** to buy.

EFFICIENT DEALERS SELL THE EFFICIENT CAR. Hundreds of enthusiastic dealers, men who should succeed, go out of the automobile business every year. They fail because they do not recognize this fact of **efficiency**—they do not sell the **efficient** car. They happen to represent an ordinary car that has to compete with the "out-of-the-ordinary" car. This new Regal "25" Underslung Touring Car at $950 is not only an "out-of-the-ordinary" car, it is an "extraordinary" car in any competition.
MORAL—then be a Regal Dealer.

EFFICIENT SPECIFICATIONS. Motor 25 H. P. 3¼ x 4½; wheel base 106 inches. Magneto and batteries (dual ignition); transmission (selective) highest grade nickel steel. Three speeds forward, one reverse; Morgan & Wright Tires, 32 x 3½. Standard Equipment. Five Lamps, Generator, Horn, Complete tool equipment. (Folding Glass Windshield and Mohair Top and Top Boot $50 extra.)

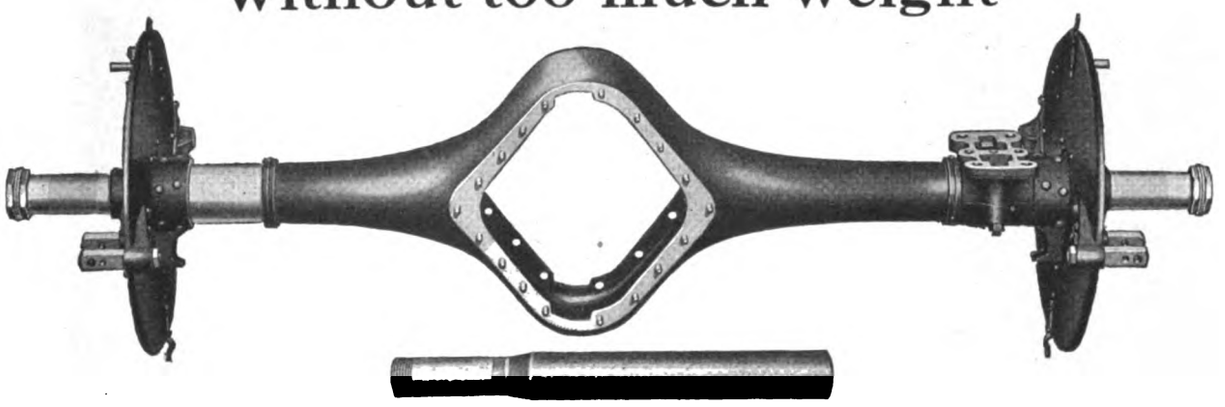
OTHER REGAL UNDERSLUNGS—The famous Regal "25" Underslung Roadster $900. The equally famous Regal "25" Underslung Colonial Coupe, $1250. The Regal "35" Underslung Touring Car $1400.

The Regal Motor Car Company, Automobile Manufacturers Detroit, Michigan

FOREIGN DEPARTMENT—18 Broadway, New York

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Axles must have strength without too much weight



STRENGTH, an axle must have. Safety demands it. Satisfactory driving for days, months and years is not possible without it.

Lightness you need for economy's sake. To get long life from tires and most miles from gasoline, your car must not be too heavy.

TIMKEN-DETROIT · AXLES ·

Combine Strength with Lightness

The first principle of Timken-Detroit construction is strength—lots of strength—and nothing sacrificed for strength.

The next principle is no useless weight.

That principle is second—and strictly secondary too. We never let it interfere with strength.

How Strength and Lightness are Obtained

Take the housing for example. It is made from pressed steel, welded along its neutral line by oxy-acetylene flame.

It is reinforced by a pressed steel sleeve from the ends which support the bearings and wheels clear through to the spring-seats which support the car and its load.

Pressed steel spiders are riveted through both housing and sleeve. They carry the dirt shields and make positive and secure anchorage for internal and external brakes.

Thus the brake anchorage is on the weight supporting member of the axle just as it should be.

Pressed steel used wherever feasible in place of malleable iron gives greatest strength with least possible weight.

Flexibility Helps by Preventing Strains

In many places if the parts were rigidly attached to each other there would be strains that are entirely lacking when the parts have "play."

There is a tendency, for instance, for the housing to rock slightly as the wheel resistance varies in travel over rough roads. Therefore the spring-seats are made so they can oscillate freely by grinding them and the parts of the housing on which they ride to very fine limits of accuracy.

The extra large spring-seats are held laterally by machined collars riveted through both housing and reinforcing sleeves.

The Timken-Detroit Axle, so strong and graceful and light, is the concrete result of long years of experience and study on just one thing—the designing and building of axles that have maximum strength with no useless weight.

The Timken-Detroit Axle Company

Detroit, Michigan, U. S. A.

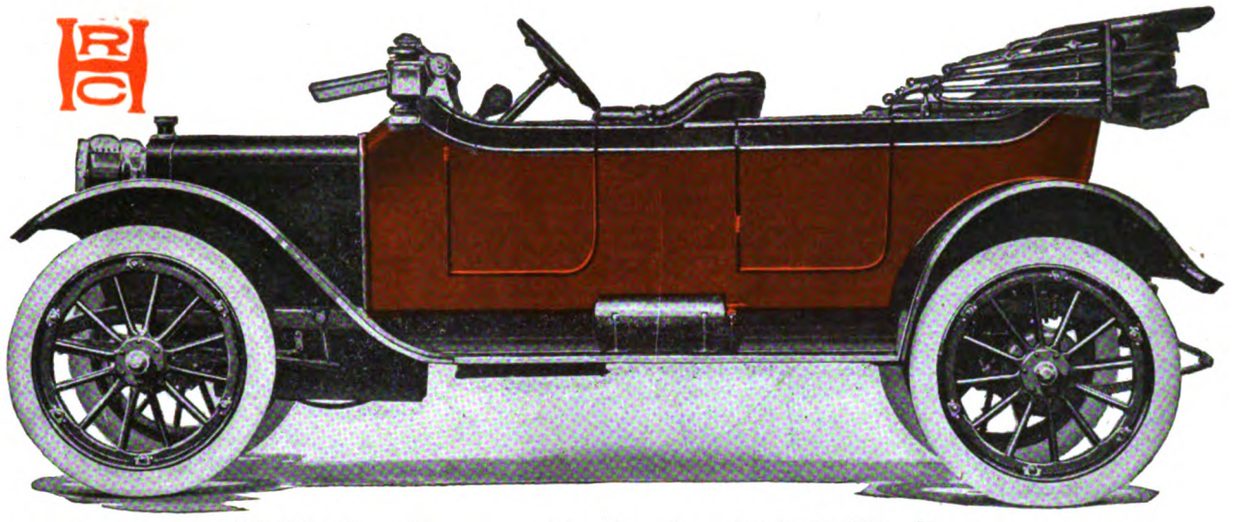
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The only axle manufacturer licensed to make axles equipped with the famous Timken Roller Bearings

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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

The Coupon Below Means a Profitable Connection for 1,000 More Dealers

FOR the coming season we want to make the representation of the R-C-H country-wide—something we were unable to do this year because our entire output was oversold before the territory was completely covered.

With a 1913 output of 30,000 cars, we want an R-C-H dealer covering every county in the United States.

We ask every dealer who reads this advertisement to consider carefully what his own buying public demands in a car; to note what the R-C-H offers them; and to determine for himself whether any other car at near its price comes so near to filling the ideal of the average man.

Then mail us the coupon below. It binds neither of us; but it gives us a chance to get better acquainted. And we do not think any car on the market offers a better opportunity, both present and future, to the aggressive, progressive dealer.

R-C-H

"Twenty-Five"

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32 x 3½ tires, demountable and quick detachable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy Curtains, adjusted in an instant, and make the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

STANDARD MODEL

$850 F. O. B. DETROIT

Top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

STANDARD MODEL

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

R-C-H CORPORATION 104 Lycaste Street Detroit, Michigan

Branches

Atlanta, 548 Peachtree St.
Boston, 563 Boylston St.
Buffalo, 1225 Main St.
Chicago, 2021 Michigan Ave.
Cleveland, 2122 Euclid Ave.
Denver, 1520 Broadway.
Minneapolis, 1206 Hennepin Ave.
New York, 1989 Broadway.
Philadelphia, 330 No. Broad St.
Detroit, Woodward and Warren Aves.
Kansas City, 3501 Main St.
Los Angeles, 1242 S. Flower St.
Walkerville, Ontario, Canada.

General R-C-H Specifications

Motor—4 cylinders, cast en bloc—3¼ inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

COUPON

R-C-H Corporation,
104 Lycaste Street, Detroit, Mich.

I am interested in the R-C-H and your proposition to dealers.

I am now selling.....cars.

Name .....

Address .....

Town..... State.....

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Studebaker

FLANDERS 20

Studebaker Automobiles
Two Models

E-M-F 30

If You Were an Expert, What Car Would You Buy?

The time has passed when automobiles can be sold to you on their appearances or claims. This is a day when you and every purchaser must be shown what the car for which you pay your money will actually perform; what it will do. Beware of an automobile salesman who attempts to beguile you with a pleasing story. Tell him to show the goods and ***prove*** to you that his cars are worth the money.. Find out whether his car is a real car or only an assembled automobile built to sell.

You have a right to your money's worth, but it is up to you to see that you get it. Deeper than all appearances, there are a few expert tests which ought to be applied to every car.

Who makes the car? Is it an assembled car or made from top to bottom by one manufacturer? What kind of a guarantee is on it? Does the manufacturer respect his own product with a real guarantee, or does he want you to take the chance? What do parts cost you and how conveniently can you get them? How many cars of this make are in service and how many are giving satisfaction? Questions like these go deep into the heart of the case, and if you put them rigorously upon any car you will find out with a certainty whether or not that car is worth its price.

We are selling Studebaker E-M-F "30" and Flanders "20" cars because we know that, dollar for dollar, their equal is not sold in the market today. The records of many thousands of cars in all kinds of service have convinced us absolutely. Studebaker E-M-F "30" and Flanders "20" cars are built to run, and because they run they sell. If we cannot prove to you under the most searching test that Studebaker cars are absolutely the best automobile values in the market, we do not want your business; but we ***can*** prove it, and your neighbors who drive these cars will tell you the same thing.

Be an expert when it comes to buying a car. You can, by getting from us some further ideas on real tests of an automobile. Clip the attached coupon and sent it to us now, because we have something new to tell you which you ought to know, whatever car you have in mind.

The Studebaker Corporation

Detroit, Michigan

TEAR OFF HERE

STUDEBAKER CORPORATION, Detroit, Mich.:
I'll be glad to know how you think a man ought to buy a car, if he wants his money's worth.

Name.....

Address.....

.....

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No-Rim-Cut Tires—10% Oversize

Our Average Profit is 8½%

When one maker of anything outsells every rival—reaches the topmost place—it is well to know the reason why.

It means that more people approve his creation than anything else of its kind.

It means that the maker, in some way, has accomplished what others haven't.

And the chances are you would join the majority, knowing what they know.

When the article in question involves big yearly expense, the facts are worth looking up.

Goodyear No-Rim-Cut Tires now hold the topmost place. They far outsell all rivals.

In the past 24 months the demand has increased by over 500 per cent.

Over one million of these tires have been tested, on some 200,000 cars.

The demand today—after all that experience—is three times larger than one year ago.

That astounding record—rarely excelled in all the history of business—marks a tire, Mr. Motorist, which you ought to know.

Ten Years Spent Getting Ready

The success of this tire is a sudden sensation. But we began to perfect it 13 years ago.

We started with the idea that he who gives most will get most.

So we surrounded ourselves with experts—the ablest men we could find. And we told them to secure the maximum mileage without any regard to expense.

It was years before we approached tire perfection. It was ten years from the start before tire buyers realized what the Goodyear concern had done. Then came this avalanche of trade.

Mileage Tests

To learn facts quickly we did two things.

We put Goodyear tires on thousands of taxicabs—where mileage is known, where conditions are arduous, where comparisons are quickly made.

And we built in our shops a tire testing machine. There four tires at a time are constantly worn out, under all road conditions, while meters record the mileage.

Thus we compared every fabric and formula, every grade of material, every method of wrapping and vulcanizing.

Thus every idea which our experts developed was put to the mileage test. Thus rival tires were compared with our own.

Thus year after year Goodyear tires were made better. In the course of time we got close to finality.

Rim-Cutting Ended

Then we found a way to end rim-cutting—a method controlled by our patents.

We examined thousands of ruined old-type tires, and we found that 23 per cent. had been rim-cut. By ending this trouble—at vast expense—we saved that 23 per cent.

In seven years' experience with No-Rim-Cut tires there has never been an instance of rim-cutting.

Adding 25 Per Cent to the Mileage

Then we found that extras added to cars were overloading tires.

GOODYEAR
AKRON, OHIO
No-Rim-Cut Tires
With or Without Non-Skid Treads

So we made these tires—No-Rim-Cut tires—10 per cent over the rated size.

That meant 10 per cent more air—10 per cent added carrying capacity. And that, with the average car, adds 25 per cent to the tire mileage.

With these tires of maximum quality—made oversize, made so they can't rim-cut—we met the prices of other standard tires.

Average Profit 8½%

Last year our average profit on No-Rim-Cut tires was 8½%.

Every penny we got, save a profit of 8½%, went into size and quality.

That in a factory with the largest output and most modern equipment ever known in this industry.

That in a risky business, with fluctuating materials, on a tire that's guaranteed.

You will never get more for your money—more mileage per dollar spent—than in Goodyear No-Rim-Cut tires. That must be apparent to you.

The proof of that fact has brought 200,000 motorists to the use of these premier tires.

Our 1912 Tire Book—based on 13 years of tire making—is filled with facts you should know. Ask us to mail it to you.

THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio

Branches and Agencies in 103 Principal Cities
More Service Stations Than Any Other Tire.

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont. **Canadian Factory, Bowmanville, Ont.**

(606)

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Motoring Comfort and Safety.

STOP long enough to consider the warning signal problem.

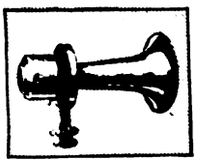
¶ With the TUTO Horn you do all of the car signalling—a low note for ordinary service, not objectionable yet effective—a loud note for emergency purposes, instantly responsive by a full pressure on the same button that makes the low note.

¶ With the TUTO Horn it is not necessary to decide beforehand whether the signal note is to be low or loud. Try the low—it commands attention 90% of the time. Instantly the loud note can be had if neccessary—no indecision—no confusion—positive and safe.

¶ The TUTO is the only two-tone horn (patented); it is the only signal that completely does away with the bulb horn, with the necessity of unhandy manipulation and the going from the bulb to the button which is required when the one-note electric horn is used.

¶ The TUTO Horn is not a one purpose emergency horn, merely supplementary to the bulb horn. It is a complete warning signal equipment, made to fulfill modern traffic and touring conditions.

¶ The TUTO Horn is pronounced the best for standard equipment by conservative car owners and by leading car designers, engineers and heads of sales departments.

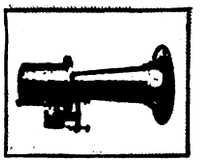


TUTO Horn, $25.00

The Dean Electric Co.

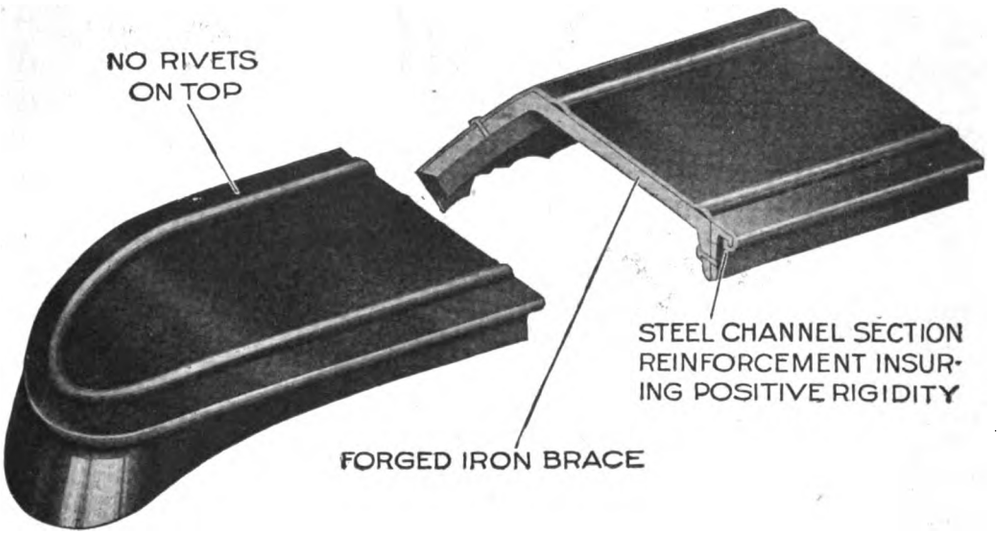
260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

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"No Automobile Maker Could Duplicate in Quality and Price the Fenders and Sheet Metal Parts Made by the Hayes Manufacturing Company."

The man who said that is an automobile manufacturer of international fame. He has used Hayes fenders and sheet metal parts for years. He has had the full benefit of the Hayes service and knows its value as a means of facilitating his own factory production and giving a distinguished quality to the cars he puts out.

More and more is the Hayes service being depended upon to expedite production —whether that production be large or small. Think of the advantage of having fenders brought into your factory completely equipped with fender irons and running boards fully enameled! Even fitted to your chassis. AND AT A PRICE FAR LOWER THAN YOU COULD DO THE WORK.

We are in a position to deliver the sheet metal work to you in any stage of completion you say. If you want to do the enameling, finishing and fitting, very well. In that case we will ship you the goods with anti-rust baked on and you can do the rest.

Let us make you a sample set of fenders, for instance, from your blue prints. You will then realize why the progressive builders of motor cars depend on the Hayes service. Our engineers will be at your service for consultation any time you say.

We are the largest users of sheet metal in the world, supply everything in that line for the automobile—Bodies, Fenders, Tool and Battery Boxes, Gasoline Tanks, Shrouds, Hoods, Running Boards, Shields, Mufflers, etc. WE WERE THE PIONEER BUILDERS OF ALL-METAL BODIES. We build them in one of the most completely equipped plants in the country.

HAYES MANUFACTURING CO., Detroit, Mich.

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Time: 3 A. M.
Scene: 20 Miles from Nowhere
Trouble: Everything
Lost: Sleep! $80! One girl!
Monolog: G'r'r'r!!

Tire Misery Must Go!

Get Protection Pleasure

GET rid of tire misery *now*. You can't afford to delay using these tire protectors. You can't afford it from either a money-losing or pleasure-losing standpoint. And now you never need endure another of those costly tire troubles, not even the least of them. They are all ended. For here is a tire protection that protects. Protects against puncture, blowout, stone cut or bruise, chafing, and all the other forms of wear and tear. Think of riding on one set of tires for more than two years' constant travel, over good roads and bad, without a single tire trouble. Thousands of motorists who have found that Standard Tire Protectors keep tires uninjured, sound and good as new long after the longest lifetime of unprotected tires, are getting the pleasures and making the savings that you can get and save with

Standard Tire Protectors

No freakish filler or leather tread! The toughest rubber ever produced—a new rubber—is used exclusively in Standard Tire Protectors for 1912. With layers of fabric that will stop nails, glass and all other tire dangers—this new and toughest rubber makes Standard Tire Protectors almost like armor plate around, over and outside your tire. All disappointing "retreading" unnecessary longer!

save you cost of missing trains, failing to meet business appointments on time, getting to the theatre when the play is half over,—they save you the costs of delay at all those times when delay means agony.

Skidding protection is combined with tire protection—the economy of double protection at just one single cost—by our famous non-skid tread, which may be had instead of plain tread if desired.

Lower Prices This Year

are the result of our new manufacturing facilities. On all the popular sizes, fully 20 per cent reduction from 1911 prices removes the least reason for you to hesitate. Standard Tire Protectors would be an economy at several times the prices you will pay for them. They

FREE Book on Tire Protection

You will find it full of valuable information and convincing proof that your tires need no longer be the bane of your motoring pleasures. Write for this free book today.





The Standard Tire Protector Co.,
548 E. Market St., Akron, Ohio

Dealers:— 20 per cent average reduction to consumers and new scale of larger discounts to dealers, make Standard Tire Protectors one of your best-paying lines of auto accessories. You know that your last year's sales of Standard Tire Protectors would have been more than doubled had it not been for that troublesome price question. It is now solved. Our 1912 prices to consumers are far lower, dealer's discounts higher and the product far better than ever. The advance orders prove we shall sell five times as many Standard Tire Protectors in 1912 as we sold in 1911. You want to get your share of this increasing business. We are advertising nationally—reaching all motor car users. They will expect to get Standard Tire Protectors from you. Write us for new prices, terms and particulars of co-operation offered.

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The NATIONAL is a mechanical starter, which, of all types—compressed air, acetylene gas, electric, and spring—is the only one on the market which at all times proves absolutely reliable. In no respect is it a "hit-or-miss" proposition—working one minute and short-circuiting or blowing out a cylinder head the next. It gives 100 per cent. uninterrupted service from the time it is attached. It comprises so few parts and is so simple and direct in application that it cannot get out of order. And it is as safe and durable as it is simple and effective.

How the NATIONAL Starter Operates

The NATIONAL starts the motor in the natural way—by turning it over. It offers all the advantages of hand-cranking with all the danger and inconvenience left out. It is quickly attached without changing any part of the car's construction. It operates by means of a foot pedal on the dash. Powerful leverage by which the motor is turned over is obtained through gear reduction. A simple pressure of the foot is all the effort required to spin the motor. If the motor "kicks" back, the mechanism is automatically disengaged, making injury from backfires impossible. The driver never leaves his natural sitting position. He can laugh at the man in the mudhole cranking his car.

Don't Buy a Self-Starter More Than Once—Get a NATIONAL!

Don't invest your money in a starter which you later find costs more than it is worth for upkeep. Don't invest your money in a starter which in return for half-heartedly starting your engine half the time causes enough trouble to keep two mechanics busy. Get the starter that will start your car as long as you own one—100 times out of 100—a starter whose first cost is **your** final cost—in short, the NATIONAL—the starter you will select if you take equal care in investigating them all.

Price Complete, Attached to Car, $50.00. Write for further information.

DEALERS **It doesn't require salesmanship to sell an article for which everyone is clamoring. Bring the NATIONAL and the motorist together and a sale results. Territory allotments are going fast. Get yours today.**

NATIONAL GAS ENGINE STARTER COMPANY

30-32 N. Dearborn Street **CHICAGO, ILL.**

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The First Time You Wore Silk Socks

When did you begin to wear silk hose?

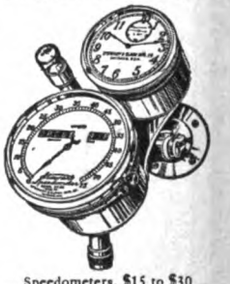
Up to three years ago the haberdasher couldn't *buy* them as cheaply as he *retails* them now. Then a hard-headed hosiery maker figured out the *reason* there was so little silk hose business. Silk socks at $1.25 a pair were too expensive for ninety-nine men out of a hundred. *Because* they were too expensive the *output* was small, and so long as the output was *small*, overhead charges were so *heavy* on each *pair* of socks that the price just *had* to be high.

So he built a *bigger* factory than anyone else and advertised silk hose at 50 cents. He sold *fifty* pairs where he'd sold *one* before. He made very little on each *sale*, but he made so *many* sales that he grew rich. Today silk hose are *twice* as good at *half* the price.

When we came into the speedometer business we found the same condition. We were good *business* men as well as good *speedometer* makers. We built the *finest* plant money could *equip*, installed the best machinery that could be *planned*, built speedometers in *enormous* quantities, sold them at *insignificant* prices—and sold so *many* that we made more money than anybody else, and could therefore keep *improving* the plant and keep improving the *speedometer*. This year we added 33,000 feet of floor space and an equivalent amount of better machinery.

That's why the Stewart is the best on earth and sells for the least. The next time you wonder how we do it, *use* your head and *look* at your feet.

Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial, large figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft, drop forged swivel joint, noiseless gears. *"ALWAYS ON THE JOB."*



Speedometers, $15 to $30
Clock Combinations, $45 to $70

STEWART & CLARK MANUFACTURING COMPANY

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit Minneapolis Chicago Los Angeles Boston Cleveland San Francisco New York Kansas City London Philadelphia Paris Indianapolis

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McCUE

Wire Wheels Benefit Just Three People

The Car Owner
The Car Dealer
The Car Manufacturer

They Benefit these People
in Just One Way——
By Greatly Increasing the
Demand for Cars——
How Do They Do This ?
Chiefly by Increasing the
Life of Tires 70%

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Wooden Wheels Are as Inefficient

NO LONGER is there any uncertainty about the coming of wire wheels. Beginning with the year 1913, many American manufacturers will adopt them. These manufacturers, the dealers who sell their cars, and the people who buy their cars will be the first to profit from wire wheels. Their profit will be so great that 1914 will, undoubtedly, see wire wheels the rule rather than the exception.

A McCue wire wheel is in effect a suspension wheel. By that we mean that the hub and all the weight that the hub carries is suspended by wires from 70 common points. As a result, all the stress and strain carried by this hub instead of being concentrated at one of two or three points, is equally distributed from the 70 points. It also can be seen readily that any shock caused by the tire or wheel striking an object in the road, in the case of a wire wheel, is transmitted to the 70 points of suspension.

Wooden Wheels Ruin Fabric.

In the case of a wooden wheel, this shock is transmitted directly through its point of contact, by the rigid wooden spoke nearest to the point of contact, permanently injuring the fabric of the tire, which results in a blow-out, sooner or later. In addition to this, the shock is transmitted in a wooden wheel directly to the mechanism of the car, shortening its life in consequence. Wire wheels perform the function of another spring between the hub and the tire rather than a solid, non-flexible support.

Wire wheels show a great saving in weight. Just how great this saving is may easily be seen by comparing a wire wheel, which weighs from 21 to 25 pounds, with a demountable rim, which alone weighs 43 pounds. In other words, a demountable rim alone weighs on an average twice as much as a wire wheel. Being lighter in weight, wire wheels permit the motor to pick up faster than if they were heavy, especially as the reduction in weight is made almost entirely in the periphery. Inversely, then, if the lightness in the weight at this point makes the wheels easier to turn initially, it is true that this lightness of weight reduces the strain when the brakes are applied—the braking strain.



How McCue Wire Wheels Save Tires.

Two elements enter into the enormous saving of tires effected by McCue wire wheels.

First, the fact that the wheels of metal are conductors of heat, while wooden wheels are non-conductors of heat; second, the springiness or shock absorbing ability of wire wheels over wooden wheels.

The most serious source of the wearing out of tires and the causing of blow-outs is the excessive heat produced during the driving of the car, especially in hot weather. Every motorist knows that the tires become so hot as to be almost impossible to handle. If these tires are mounted on

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for Pleasure Cars as Steel Tires



wooden wheels, which are non-conductors of heat, all of this heat remains within the tires and tends to crack and harden them.

The process known as de-vulcanization takes place. The tires lose their strength; blow-outs result. In the case of the wire wheel, however, the action is almost the same as that of a radiator or of the fins on the cylinders of an air-cooled motor. The heat generated in the tire is conducted by the metal rim to the various metal spokes and in turn dissipated by contact with the air. This is, of course, the primary means of saving tires and increasing their life greatly.

The other principle may be illustrated by this simile. If you strike your hand against a solid post you either jar yourself terribly or perhaps fracture some of the bones in your hand, depending entirely upon the force of the blow. But if you strike a quick blow against a punching bag which is suspended between rubber or hangs free, you scarcely feel the impact on your hand.

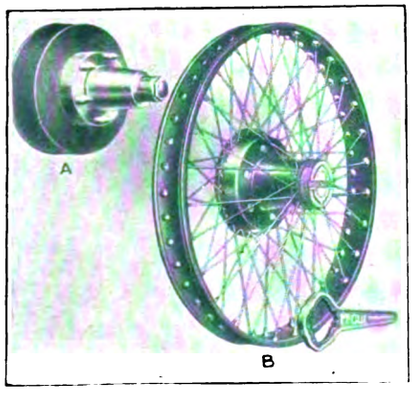
If, when your tire is traveling over the ground on a wooden wheel, you strike a stone or obstruction, the jolt damages the tire considerably more than if the wheel were wire. For in the case of the wooden wheel, the tire receives the shock as in the case of striking the solid post. But in the wire wheel, as in hitting the punching bag, the shock is passed along into the wire spokes and the wheel is forced to stand its share of the burden.

Tires Don't Wear Out Nowadays.

It is an admitted fact that no longer do automobile tires wear out. They are blown-out and rendered useless long before the rubber in the tire is through giving service. The reason of this is largely due to the fact that wooden wheels, because of their rigidity, force the fabric of the tires to crack and give way and make blow-outs possible, long before the tires are worn out.

Numerous tests are recorded which thoroughly demonstrate the statement that wire wheels are stronger than wooden wheels.

McCue Wire Wheels Are Demountable.



McCue wire wheels are in no way a new product. The McCue Company have been turning out wire wheels ever since the beginning of bicycles and wire wheels abroad are a definite and firmly established component of the leading makes of cars. Remember, too, that a McCue wire wheel is more easily demounted in case of a puncture than any demountable rim ever made. Cut on opposite page shows wrench in place. Cut on this page shows hub, from which wheel has been demounted, wheel, and wrench.

When we say that McCue wire wheels increase your tire life 70 per cent, we are using a commonly accepted figure by those who have made exhaustive tests. As a matter of fact, one of the most recent tests, that of the English Daimler, showed an actual measured saving of 68.75 per cent greater life with wire wheels over the use of wooden wheels.

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McCUE

Does the car you sell give twice the mileage of the one sold by your competitors?

It does not require any great amount of brain work to figure out the advantage enjoyed by the dealer who is able to guarantee twice the mileage of his competitor. Every dealer of automobiles knows that the greatest single drawback to the sale of cars is the cost of operation and that one of the greatest single points affecting cost of operation is the cost of tires. Increase the life of your tires 70 per cent and you have come a long way towards answering the majority of objections.

If the automobile dealers of this country will insist upon McCue wire wheels on the cars they sell, wire wheels will be on the cars.

70% MORE TIRE MILES WIRE McCUE WHEELS

This is true, because the manufacturers of today know that the claims we make are correct.

You know the value of being the first to offer to the public such a revolutionary improvement as wire wheels are bound to be. Urge upon your manufacturer the necessity of acting fast in this proposition. Don't wait until after everybody else has adopted wire wheels before you come out with them. Be the leader.

We are conducting an enormous educational campaign of advertising so that the general public will look for wire wheels on cars of the future—they will be a sales asset on every automobile. Aren't you going to have them on the automobile you sell next year?

THE McCUE COMPANY, Buffalo, New York

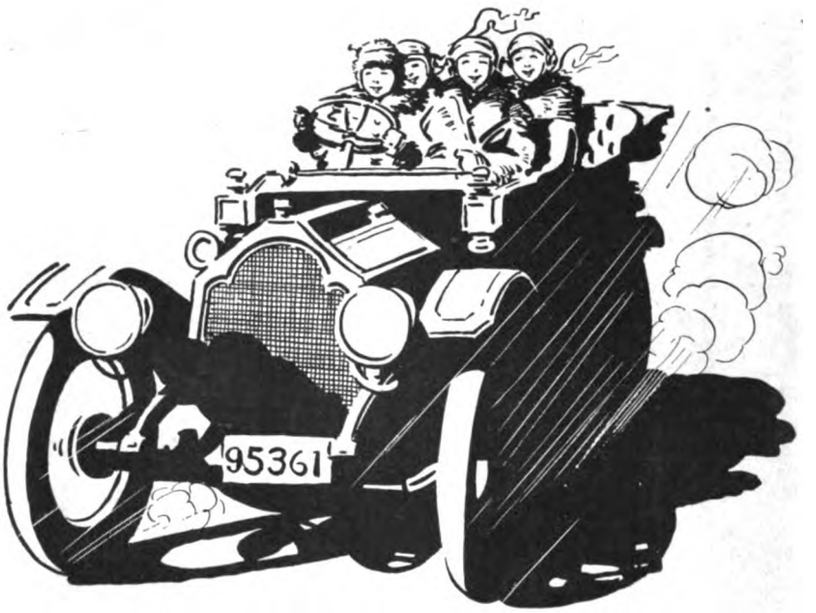
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WHY NOT

SELL GAS CARS TO THE LADIES

The Electric Self-Cranker

WILL HELP YOU



The finest lady in the land can operate a car equipped with an

ELECTRIC SELF-CRANKER

DON'T FORGET THAT THE

CLBA

(CLASS B)

SELF-CRANKING BATTERY

IS A VITAL PART OF AN ELECTRIC CRANKING OUTFIT

With a Self-Cranker You Can Easily Have ELECTRIC LIGHTS

Class A Batteries are for ELECTRIC LIGHTING
Class B Batteries are for ELECTRIC CRANKING and LIGHTING

Write us for full information

WILLARD STORAGE BATTERY COMPANY

CLEVELAND, OHIO

New York Branch: 136 W. 52d St. Detroit Branch: 1191 Woodward Ave. Chicago Branch: 436 So. Dearborn St.

Depots in all principal cities in the United States and Canada

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SENSATIONAL ANNOUNCEMENT

TO 600,000 AUTOMOBILE OWNERS AND DEALERS

Invincible Starter

NOW $10

Safely past the experimental stage—the INVINCIBLE STARTER has "stood the gaff" of use in hot or cold weather with equal dependability. We have our immense factory facilities thoroughly organized, and turning out starters by the thousands—at the lowest possible cost consistent with a quality we can ABSOLUTELY GUARANTEE.

When we fixed the price at $25 we based our costs on a production of 10,000 starters, and had to provide for advertising and other selling expense, incidental to the introduction of a new product. Today the INVINCIBLE is an assured success—the demand is here—we can build 100,000 starters at a much lower cost and—YOU get the benefit.

Today a Ten Dollar Bill Insures You Against Broken Arms and All the Danger and Annoyance of Cranking.

The INVINCIBLE STARTER operates on a proper mixture of acetylene gas and air—a method which meets with the greatest technical and popular approval. By pressing a foot button located in a natural position on the dash, a just-right proportion of acetylene gas and air is admitted to the intake manifold, thence to the cylinders. To start the car, it is only necessary to go through the ordinary operations for starting on the spark. In stopping, you retard the spark and throttle and the last revolution of the motor draws in a mixture ready for the next start. Each start costs less than 1/25 of a cent. No fouling of spark plugs—no muffler, or exhaust explosions.

The reliability of the INVINCIBLE STARTER is testified to by thousands of users. It is adopted and indorsed by the U. S. Motors Co. and many other well known manufacturers.

At this new price—$10—it is almost criminal for car owners not to protect themselves against "cranking" accidents.

To the Automobile Dealer this Announcement opens the way to Big Business—quick sales—and reasonable profits. Every owner is a prospect, and a "show-me" demonstration means a starter sold.

Write today and see if you are in open territory.

To Insure Prompt Attention, Please Use This Blank.
Orders, or requests for information, will be numbered and given attention in turn.

Enclosed find $10.00 for 1 Invincible Starter Outfit.
Make of Car..... No.....
Year..... Make of Magneto.....
Location of Gas Tank.....
Please send Catalog (cross off above if Catalog only is wanted).
Name .....
Address .....(M.W.)

Invincible Starter Co.

Penobscot Bldg.

DETROIT, MICHIGAN

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THIS GREAT OFFER Cannot Be Duplicated

It is made possible only by the unequalled buying and manufacturing facilities of the world's greatest magneto factory. It means simply this

You can have a new Remy Magneto—the best and highest type of ignition—on your car for practically the cost of repairs on your present system.

HERE IS THE REMY EXCHANGE OFFER

	List Price	Allowance	Net to You
2-Cylinder Remy Magneto with coil—complete .	$46.00	$9.20	$38.00
4-Cylinder Remy Magneto with coil—complete .	50.00	10.00	40.00
6-Cylinder Remy Magneto with coil—complete .	52.00	10.40	41.60

Remy Records

The superiority of Remy ignition is a matter of record wherever it is found. The winner of the 500 mile International Sweepstakes race last May, and the winners of many more of the greatest speed contests, attribute their success in a measure, to the Remy Magneto, while hundreds of thousands of private owners find the Remy the only magneto that will unfailingly stand the test of hard daily service.

Remy Service

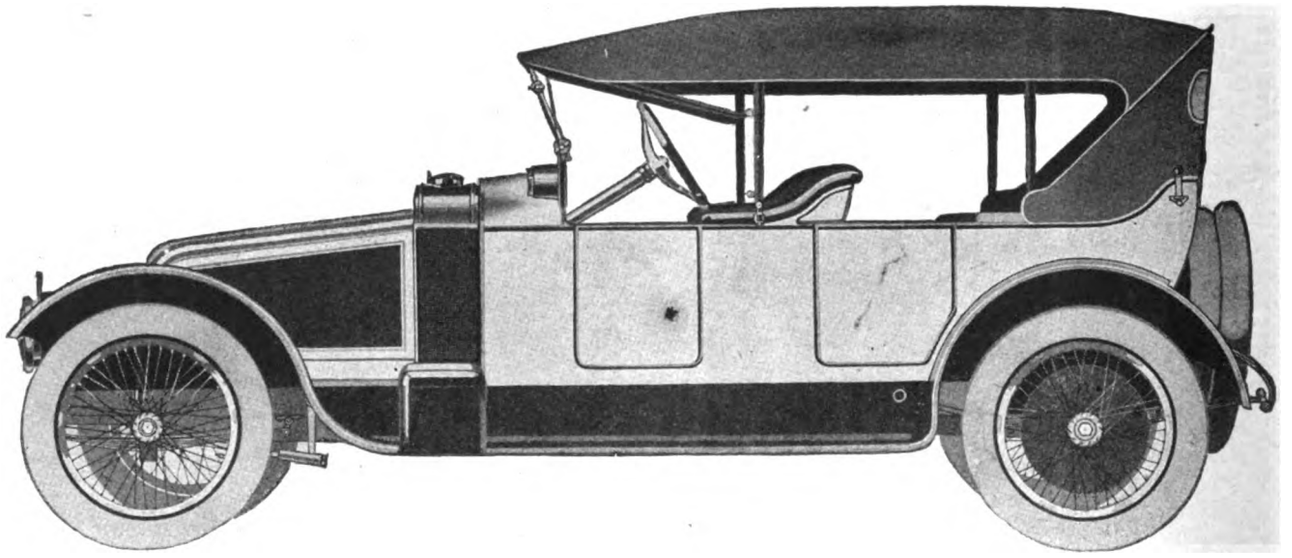
is known from coast to coast for the advantages it offers Remy owners. A Service Station in every motoring center in the country, with a staff of ignition experts always ready to attend to your magneto troubles is a guarantee of absolute efficiency that cannot be duplicated. Remy Service is the key to confident, pleasant motoring.



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KEETON

DETROIT, U.S.A.



Six Cylinders—$2500

Self starting.

Electrically lighted with dynamo.

Imported ball bearing transmission and axles throughout.

Long Stroke motors of great power and efficiency.

Pressed steel, full floating type, rear axle.

Chrome vanadium gears and shafts.

Long easy riding springs.

Artillery wheels with option of wire wheels on 6 cylinder; demountable rims; oversize tires.

Radiator located at dash in the proper and protected position.

Equipment especially liberal.

Manufactured in United States under exclusive patent rights.

Cars designed and manufactured by men who have been in the business since its inception and who are thoroughly familiar with both domestic and foreign practice.

Pioneer builders of left hand drive and center control cars.

Only French Type of car built in America.

The best foreign practice adapted to American roads and conditions.

PRICE OF SIXES

Riverside and Meadowbrook Sixes	$2500
Tuxedo Coupe, Six	2850
Six Chassis, without tires and rear guards	2150

All prices f. o. b. factory

PRICE OF FOURS

Riverside and Meadowbrook models, with full equipment as noted	$2250
Tuxedo Coupe, with full equipment	2600
Chassis without tires or rear guards	1750

All prices f. o. b. factory

Write for Catalogue and Dealer's Proposition

KEETON MOTOR COMPANY

Detroit, U. S. A.

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The First High Quality Electric Truck at a Popular Price

The first and most important point of this announcement is that it concerns the first **real reliable electric delivery truck that can be sold for less than $2200.**

The M & P Electric Truck is a creation of modern design and a logical result of a study of the failures that have characterized this branch of the industry.

We have studied the electric truck as it is today, eliminated its weak points, strengthened its stronger points and, as a finality, we present to the consideration of dealers, an electric vehicle that is absolutely perfect in every detail.

The M & P Electric is the first 1000-pound truck to compete with the gasoline car for delivering.

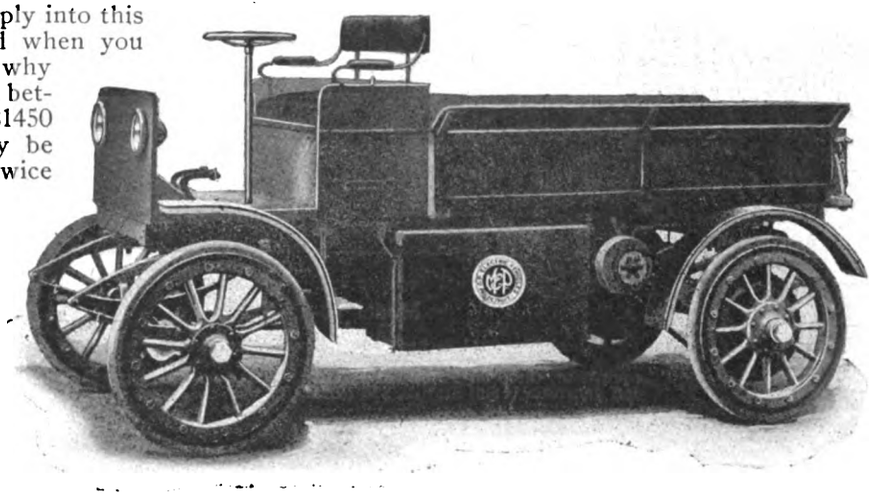
You, Mr. Dealer, know that up until this time, the ordinary store keeper was content with a gasoline car of the same capacity which he could buy for $1000 or $1500. The electric truck was clear outside the radius of the ordinary merchant's purchasing ability.

The M & P Electric Truck sells for $1500 complete in every particular and with full equipment—

In the making, quality has predominated. There has been nothing skimped in either the weight or caliber of the materials used. Springs, axles, frames and motor are as good as can be made and vigorous tests have proved the highest efficiency of this car.

In fact, the M & P Electric was built before the selling price was decided and a very narrow margin of profit allotted by ourselves to ourselves.

let us go more deeply into this matter with you and when you write ask us to prove why we can and do build a better electric truck for $1450 than could ordinarily be bought for nearly twice that amount.



M & P Electric Vehicle Co.

Franklin and Dubois Sts.

DETROIT, MICH.

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Overland

DESPITE kaleidoscopic changes in the industry the Overland Model 60 at $1200 retains its supremacy among popular priced cars.

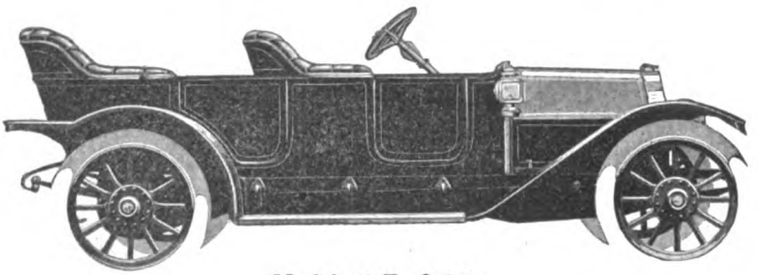
Others have changed a body design or added an accessory—foolishly trying in this manner to make you see an increased value.

Ever since their advent Overland Cars have lead in value; Model 60 Overland at $1200 is the biggest value of all. We have conscientiously striven with the sturdy aids—efficiency and economy—to make its value biggest.

The power, speed, silence, comfort and service of the Overland Model 60 cannot be equaled at less than $1500 in any other line. Compare and see.

Ask for book I-45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor, 4⅛ x 4½; horse-power, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, May 23, 1912. No. 9

SPLITDORF SALE IS CONSUMMATED

Alvord Heads New Company Which Will Greatly Widen Scope of Business—Removal to New Jersey Assured.

After untying a small knot which developed almost at the eleventh hour, when the transaction was on the point of consummation, the negotiations between Chas. F. Splitdorf, Inc., of New York, and The Torrington Co., of Torrington, Conn., of which John F. Alvord is the head and heart, have resulted in the formation of the Splitdorf Electrical Co., which has been incorporated under the laws of New Jersey with a paid in capital of $3,500,000. Of this capital, $1,500,000 is represented by 7 per cent. cumulative preferred shares and the remainder by common stock.

Mr. Alvord acquires control of the new company and has assumed the presidency, Charles F. Splitdorf has been chosen vice-president, Bryant S. Keefer treasurer and Charles W. Curtiss, secretary and general manager. These officers with John R. Viles constitute the board of directors. Messrs. Keefer and Curtiss long have been associated with Alvord's varied interests and are two of his most trusted lieutenants.

John Splitdorf, who with his brother Charles constituted the Splitdorf corporation, will retain a handsome interest in the new Splitdorf Electrical Co., but will relinquish the more strenuous factory cares which have been his portion for the better part of half a century. Henceforth his duties will be largely of an advisory character. "Charley" Splitdorf, as he is known to all, will remain as strenuously active and circulate as widely and as likably as always has been the case. While it is not definitely settled, is is understood that P. J. W. Kelly, the Splitdorf manager, will be made assistant secretary of the new company.

No radical changes immediately will be made in the conduct of the Splitdorf business, but it is certain that it will remove from New York to New Jersey and locate in the vicinity of Newark, which place is named as the office of the new corporation. No date, however, has been set for the removal.

The manufacture of magnetos, coils and spark plugs will be continued, of course, and on a very much more extensive scale. Mr. Alvord's interests in the Nagautuck Valley in Connecticut, and elsewhere, are so great, and as among other things they include the manufacture of carburetters, windshields and motor boat engines, it is not unlikely that the scope of the Splitdorf Electrical Co. untimately will be extended in a manner or in so many directions as to cause the trade to open its eyes.

Studebaker Takes Over Canadian E-M-F.

The E-M-F Co., of Canada, Ltd., which operated the Studebaker plant in Walkerville, Ont., has been taken over by a new company, the Studebaker Corporation of Canada, Ltd., which, however, represents chiefly a change of name as the interests involved remain the same. Concurrently, Frank E. Fisher, himself a Canadian, who during the last year or so has been connected with the Studebaker export department, has been appointed manager of the Canadian corporation and will have full charge of the factory at Walkerville, and general direction of the Studebaker business in the Dominion, which he has traveled from one end to the other. The factory risks of the Walkerville plant are being increased from 50 to 100 per cent., and hereafter less assembling and more actual manufacturing will be performed there; also more of the Studebaker cars shipped abroad will be sent from the Canadian factory.

Philp Joins the Studebaker Staff.

Arthur I. Philp, at one time vice-president of Morgan & Wright, and who became manager of the central district of the United States Tire Co., when it was organized, has been appointed assistant sales manager of the Studebaker Corporation, of Detroit. Philp, who is one of the most popular men in the trade, resigned his connection with the tire company about three months ago.

DODGES WILL MANUFACTURE CARS

Ford's Former Engine Builders to Enlarge Their Sphere—Metzger-Flanders Project Takes on $60,000,000 Color.

To employ a homely descriptive, it may be said that the fires are smoldering in Detroit. The men who lit the fires, however, still have an abundance of fat kindling wood on hand, and the flames may loom large at any moment; which is to say that the negotiations between the Metzger Motor Car Co. and Walter E. Flanders, and the interests which he represents, remain about as they were a week since. Flanders has not been released by the Studebaker Corporation and until he finds a way to relieve that embarrassment he must remain more or less in the background and conduct operations through third persons. There are those in Detroit who say that most of the operations are being conducted in a private house on Brush street which has been rented for the purpose.

According to the latest and apparently reliable reports, there are many more "third persons" than at first appeared to be the case. It is said that there is in contemplation a $60,000,000 merger which will include much more than the Metzger and Flanders properties. New names are linked with it almost every day. Lacking definite information, it is not fair to print the names; but it may be said that some of them will make strange bedfellows, if ever the merger comes to pass in its prospective form. Wall Street apparently inclines to automobile mergers, and it is not wholly a state secret that within the last six months some of its representatives have been quite active in Ohio, Indiana and Michigan and have approached some of those who are worth while and others whose worth is problematical. In several instances, they already have been permitted to examine the books of those who incline their way. They have kept their proceedings fairly quiet, but their hands are likely to be dis-

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closed at any moment in unexpected places.

About the only definite development of the week, so far as Detroit itself is concerned, is that Dodge Bros., who are large stockholders in the Ford Motor Co. and who formerly built the Ford engines, are preparing to engage in the manufacture of complete cars. The Dodge name early was associated with the Metzger-Flanders transaction, but it is more or less emphatically denied that they had to do with that project.

To a Motor World man John Dodge himself made the denial, which was reiterated by those who are in his confidence. Mr. Dodge also declared that there is not a word of truth in the report that he had disposed of his interests in the Ford Motor Co., but he frankly admitted, in reply to the point-blank question, that the Dodge brothers intended to engage in the manufacture of automobiles. He stated that it would be some time before he could make a definite statement regarding the nature of the car they will build, or when it will make its appearance, but that the Dodge plans are rapidly shaping themselves is indicated by the fact that several cars already are being tested and that Frederick J. Haynes, factory manager for the H. H. Franklin Mfg. Co., of Syracuse, N. Y., already has been engaged by the Dodges and will take up his duties in Detroit on June 15th next.

The Ford company now is building its own engines and latterly the Dodge brothers have produced only a portion of the Ford gear work, all of which the Ford company itself is preparing to perform. The Dodge decision to take up the production of automobiles themselves is said to be influenced by their disinclination longer to place dependence on a few large accounts and is in the nature of casting an anchor to windward. Their entry into the business scarcely can fail to add to the interest of an already interesting situation.

Steel Cushion Tire Owes Landlord $2,113.

Apparently because its anticipations of the ease of making and marketing a substitue for the pneumatic tire were pitched too high, judgment for $2,113.37 against the Steel Cusion Tire Co., of New York, was entered this week in favor of J. F. Blanchard. The sum represents the rental of a factory building in Long Island City, which the company leased, which lease, however, it failed to carry out. Instead, it located in a smaller place on Sixth avenue in New York City.

Court Opens Books to Stockholder.

Legal permission has been granted F. H. Yeomans, of Detroit, to examine the books of the Monroe Body Co., of Pontiac, Mich. Yeomans, who is a stockholder in the company, alleged that no dividends had been paid and that he had been denied information concerning the company's production, and it was on these grounds that the court granted the necessary order for examination.

CO-OPERATIVE BEE "DOWN EAST"

It Buzzes in Vermont and New Hampshire and a Dealers' Purchasing Association Results—Scope May Be Broadened.

For the purpose of co-operating in the purchase of supplies, the Consolidated Automobile Co., has been organized, under the laws of Vermont, with headquarters in St. Johnsbury. It is stated that it is constituted of twenty dealers, a number of whom are located in New Hampshire, each of whom is pledged to purchase his supplies through the new company. Other dealers or garagemen will be admitted from time to time, as the intention prevails to reach out into practically all of the New England States, if not beyond them.

The enterprise was promoted by Howard Blossom, one of the owners of the Union Garage and Machine Co., of St. Johnsbury, where the offices and stock will be located. The officers of the company are as follows: President, George H. Davis, Barton, Vt.; vice-president, Fred. C. Cleveland, Lancaster, N. H.; treasurer and general manager, H. B. Blossom, St. Johnsbury, Vt.; secretary, R. A. Preston, St. Johnsbury, Vt. With the exception of R. A. Preston, these officers and Fred L. Johnson, Concord, N. H., J. H. Stewart, McIndoes, Vt., N. E. Parks, Coldbrook, N. H., J. Lynch, Littleton, N. H., Garfield Miller, White River Junction, Vt., and C. L. Bailey, Woodsville, Vt., constitute the directors. Auditors: Prof. H. D. Stannard, Barton, Vt., and H. M. Nelson, St. Johnsbury, Vt. Clerk: H. B. Howe, St. Johnsbury.

Rose Now Asks $110,000 for Infringement.

At least one of the reasons why the Rose Mfg. Co., of Philadelphia, Pa., interposed no strenuous opposition to the dismissal of the several suits which it had instituted against New York jobbers and supply houses, was made plain late last week when new and more reaching actions were instituted in the United States District Court for the Southern District of New York. The defendants named are Emil Grossman, Emil Grossman Co., Eclipse Specialty Co., National Sales Corporation, Motor Car Equipment Co., Gus Balzer Co., American Auto Supply Co. and Lowe Motor Supplies Co., all of New York, and all of whom were involved in the earlier suits which were dismissed.

They are charged with infringing both the Rose Mfg. Co.'s Never-Out lamp bracket patents, Nos. 883,973, 962,220 and 41,899 and 41,973, all of which patents are claimed to be capable of conjoint use and are, it is alleged, conjointly used in a single structure by the defendants. In addition to asking for the usual preliminary and perpetual injunctions, the Rose company also applies for aggregate damages exceeding $110,000, further praying that the court "may increase the actual damages assessed to a sum three times the amount of said assessment, under the circumstances of the willful and unjust infringement by the defendants."

Badger-Rushmore Appeal is Argued.

The appeal of the Badger Brass Mfg. Co., of New York, makers of Solar lamps, from the decision secured in the lower court last September by Samuel W. Rushmore, of Plainfield, N. J., was argued this week in the United States Circuit Court of Appeals for the Second Circuit in New York City. The argument was heard by Justices Lacomb, Coxe, Ward and Noyes who, however, are not expected to render an opinion for several weeks, or possibly until the Fall term of the court. The action in which Rushmore secured the verdict in the lower court charged the Badger company with infringing the patent on his design for an automobile lamp.

Parish Secures Factory in Detroit.

To better care for its trade in the West, the Parish Mfg. Co., of Reading, Pa., has acquired the factory buildings at Mt. Elliot and Harper avenues, in Detroit, which previously were occupied by the Seamless Steel Bathtub Co., and will at once remodel and re-equip them for the manufacture of automobile frames. Additional buildings also will be erected and the plant will be ready to make deliveries for the 1913 demand. Charles M. Hall, who represents the Parish company in Detroit, is in charge of the work. The Reading factory will be continued as heretofore.

Mosler Ties Up Five Price-Cutters.

Decrees pro confesso, which correspond in a way to judgments by default, were secured last week by A. R. Mosler & Co., of New York, against the National Automobile Supply Co., the Crescent Tire Co., the Willis Co., Max Ziesler and Harry Weinstein in United States District Court for the Southern District of New York. The defendant firms were charged by the Mosler company with having violated the terms of Mosler's conditional license by selling Spit-Fire sparkplugs at less than the established price.

Chicago Office for A. O. Smith Truck.

The A. O. Smith Co., of Milwaukee, has established a general sales office in Chicago, at 2328 Michigan avenue, in order to facilitate the marketing of the new Smith-Milwaukee truck. It will be in charge of C. W. Babcock, who has managed the truck department at Milwaukee since it was instituted.

Tate Electrics Locate in Windsor.

Tate Electrics, Ltd., which was organized in Toronto about a year since, has secured a factory in Windsor, Ont., which is opposite Detroit. It will produce both pleasure cars and trucks. E. A. Everett, of Detroit, is manager of the company.

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EASY MONEY FOR 35 PER CENTERS

Jury's Verdict Against Them is Set Aside by Court and "35%" Takes Heart—The Contract Involved.

After a long fight in Supreme Court for New York county, both lower and appellate, the Flash Manufacturing Co., of Zanesville, Ohio, which sought to secure payment of a claim by the 35% Automobile Supply Co., of New York and elsewhere, apparently has been beaten, or at least so far as the battle has gone it has not been favorable to the Ohio concern. The latest ruling was rendered last week by the appellate division who gave the 35% institution permission to enter a supplementary answer with counterclaim which had been denied by the lower court. Should this order be taken advantage of it practically would mean a retrial; whereas as the matter now stands neither side gains financially.

The members of the complaining concern are Edward B. Roemer, Alva L. Rea and Stephen Mills, Jr. According to admissions by both sides a contract was entered into in 1910 whereby the 35% company was to advertise the complainant's products in one of those lovely little monthly circulars issued by the former, and in consideration was to be given credit to the extent of $3,360. Almost immediately the 35% company gave an order for $2,736 worth of Flash decarbonizer which was delivered. Later in the year $1,094.40 worth of the goods were ordered. The difference of opinion was as to whether the total amount was to be credited under the contract. The Flash company claimed the larger amount was not to be so credited and that the total credit was to be used up in 12 monthly installments. The defendant made various complicating moves during the trial, entering an answer and counterclaim, which was withdrawn, seeking to enter a supplementary answer, asking judgment for itself of $624, and at one time offering to have judgment entered for some $470 for the Flash company.

A jury, however, gave a verdict for the full amount asked by the Flash company, but the judge at once set it aside. The 35% company then asked to be allowed to enter a supplementary answer reinstating the previously made counterclaim, which had been withdrawn, but the court denied the application and it was an appeal from this ruling that was taken, and that just has been decided. The 35% company may now, if it wishes, take action to recover the $624.

Asks Damages—Has to Pay Instead.

When William D. Kelly, of New York city, brought an action in New York City Court against the Victor Auto Storage Co., for $1,400, claiming breach of warranty in a car he bought, he naturally expected some results, but when this week the jury decided he was in the wrong and should pay the Victor company $72.69 he was somewhat surprised. Kelly bought a Columbia car which had been used and for which he paid $1,400. With it went a guarantee, which the Victor company held to mean that they would replace defective parts for 90 days. Kelly claimed that a number of parts gave out and should have been settled for by the Victor company. The defendant, however, set up that the parts were not presented within the time of the guarantee and that besides not being required to make good it had a bill against Kelly for repairs and parts. The jury agreed with the Victor company.

Board of Trade Gets Both Buildings.

Having effected the necessary arrangements with the lessee of Grand Central Palace, with whom it had an exclusive contract, the Automobile Board of Trade last week consummated a contract for the use of Madison Square Garden for at least one more show. It also retains the lease on the Palace and "one show in two buildings" will be the situation in New York next January. It will be an open-to-all show and will be held under the auspices of the Board of Trade, unless the pending merger of that organization with the Natianl Association of Automobile Manufacturers is consummated in the meantime. If the amalgamation is effected, a transfer of the lease easily can be arranged. The plan of alloting space in the two buildings has not been definitely settled; but it is probable that a single ticket will admit to both shows and that arrangements will be made for conveniently transporting showgoers from one to the other.

Spaulding Takes up Motor Trucks.

The Spaulding Mfg. Co., of Grinnell, Ia., which is a large manufacturer of horse vehicles, and which has produced also a few self-propelled pleasure cars, has taken up motor truck manufacture. The first of these, a light truck, is now being tried out.

Castle Acquires Factory in Indiana.

The Castle Lamp Co., of Amesbury, Mass., has acquired the property of the Richmond Mfg. Co., in Richmond, Ind., and will take possession as soon as necessary alterations are completed. This work, however, probably will require several months.

Muffler Manufacturers Going to Dunkirk.

The Motor & Mfg. Co., of Geneva, N. Y., which manufactures mufflers, has secured a factory in Dunkirk, in the same state, and is making ready to take possession. Its removal probably will be completed about June 15th.

Wainwright Sails for European Visit.

L. M. Wainwright, president of the Diamond Chain & Mfg. Co., of Indianapolis, sailed to Europe on Thursday last. He will be absent for several weeks.

DIAMOND IN GOODRICH SETTING

Detail of Surprising Deal Being Completed Officials Already Slated—What Diamond Shareholders Will Receive.

Special meetings of the stockholders of both companies have been called to ratify the purchase of the Diamond Rubber Co., of Akron, O., by the B. F. Goodrich Co. The Diamond meeting will occur May 27th and the Goodrich meeting June 3rd. Both, however, are largely matters of form as the surprising transaction between the two former bitter rivals, which was consummated almost over-night, has progressed to a point where the officers of the enlarged Goodrich company already have been selected and in due course will be formally elected. Most of them, of course, represent the Goodrich interests.

F. A. Hardy, of Chicago, president of the Diamond Rubber Co., is slated for the chairmanship of the board of directors, but as that office is largely of an honorary nature, the real work will devolve on B. G. Work, president of the Goodrich company, who will retain that office. A. H. Mason will be vice-chairman of the board of directors. A. H. Marks, of the Diamond Rubber Co., will be vice-president and general manager of the Goodrich company. E. C. Shaw will be second vice-president and will continue to perform his duties as the Goodrich works manager. H. E. Raymond, second vice-president and sales manager of the Goodrich company, will retain those offices in the new organization, while W. B. Miller, secretary of the Diamond Rubber Co., will become second vice-president and assistant sales manager, but it is generally understood that he shortly will relieve himself of all harness. C. B. Raymond, secretary of the Goodrich, will retain that title. W. K. Means will be treasurer. A. H. Noah, treasurer of the Diamond company, was tendered the office of treasurer in the new Goodrich company, but declined it as it is his intention to retire from business. He will, however, remain a member of the Goodrich board until the end of the year. O. C. Barber and C. C. Goodrich will be new members of the directorate.

For the purpose of carrying out the transaction, the capital stock of the Goodrich company will be increased from $45,000,000 to $90,000,000. Of the new issue $15,000,000 will be preferred and $30,000,000 common stock, which will make the total Goodrich capitalization consist of $30,000,000 of 7 per cent. cumulative preferred stock and $60,000,000 common stock.

According to the terms of sale, the Diamond stockholders will receive 2.7 shares of Goodrich common and one share of preferred for their present holdings, which is equivalent to receiving $370 for each $100 share and is the same basis on which the

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Goodrich "melon" was cut and divided among its stockholders on April 1st last when its capital was increased to $45,000,000, at which time the purchase of the Diamond property was unthought of. The Diamond company itself has no preferred stock, its entire capital of $10,000,000 being represented by common shares.

When the distribution of its assets is made, the Diamond stockholders also will receive a considerable amount of cash. Some estimates have placed the sum at 100 per cent. of their holdings, but those more familiar with the situation state that it is not likely to greatly exceed 50 per cent. Incidentally, the contract between the contract between the Goodrich and Diamond companies bears date May 8th.

Goldman, Sachs & Co. and Lehman Bros., of New York, and Kleinwort, Sons & Co., of London, have agreed to purchase from the Diamond Rubber Co. a large block of the stock of the B. F. Goodrich Co., which, together with a previous purchase of stock made at the time of the organization of the present the B. F. Goodrich Co., will comprise about one-half of the entire issue of the preferred stock of the latter company and a considerable amount of the common stock as well.

For the present, the Diamond organization will remain undisturbed. The Diamond brands will be fully maintained and be marketed through the Diamond branches exactly as heretofore. That no serious changes in these respects are even contemplated at this time is indicated by the fact that Sales Manager Raymond has booked passage for Europe and will sail next week.

What the audit of Diamond books showed has not been disclosed, but on April 1st last the Goodrich accounts showed total assets of $51,287,591, of which $36,787,922 was represetned by real estate, buildings, plant, machinery, goodwill, patents, etc. The other large items in the list of assets were materials and supplies, goods in process and finished product, $9,282,889, and accounts receivable, $2,199,994. Among the Goodrich investments in other companies are $5,000 in the United Rim Co., $75,000 in the O'Sullivan Rubber Heel Co., $526,750 in the Philadelphia Rubber Works and $485,436 in the Goodrich French Co. Its principal liabilities are: capital stock, $45,000,000; surplus, $2,000,000; bills payable, $2,400,665; accounts payable, $465,437 and $937,684 due the B. F. Goodrich Co., of Ohio. Its gross sales for the four years, 1908-1911, inclusive, were as follows: $13,815,914.38; $18,605,238.04; $23,806,578.76; $27,406,732.53. Its profits for the same years were: $2,793,433.12; $3,433,548.75; $1,605,254.10; $3,992,592.03, which makes an average profit per annum of $2,956.207.

Indiana Dealers Form State Association.

Growing out of a conference which was held during the Indianapolis show in February last, the Indiana Automobile Dealers' Association was organized in Indianapolis last week. M. T. Johnson, of Vincennes, was elected president; D. Ogden, of Cale, secretary, and Roy Smith, of Greensburg, treasurer. A committee to canvass the State for members was appointed, and when the plans of the organization are completed it is not unlikely that they will include a scheme for cooperative purchase of supplies.

Wipes Out "Preferred" Tire Prices.

Interest was added to the tire situation when, on Monday last, the United States Tire Co. not only met the prices set by the B. F. Goodrich Co. on April 7th, but went them a little bit better, and at the same time took the even more radical step of putting the entire trade on the same basis. This means that the preferred dealers' quotations have been wiped out and dealers and jobbers generally have been placed on what was formerly the preferred basis. The only exception to the rule is in the case of contract business on which an extrat 5 per cent. is quoted. As the Diamond Rubber Co. and the Goodyear Tire & Rubber Co., among others, previously had met the Goodrich figures, the United States's new prices to consumers are from twenty to sixty or eighty cents less than practically all the others. At the time of the Goodrich reduction, the United States company stood pat and guaranteed its trade prices until July 1st, to the larger buyers at least, all of whom now will be taken care of at the new figures. Because of its guarantee, the new schedule gave the other tire manufacturers something of a shock, but so far as can be learned, Goodrich, Diamond, Goodyear, Fisk and the other prominent companies will stand pat.

Sales Manager Settles Commission Suit.

Just what terms of settlement were agreed upon is not made public by the parties in the case, but an action brought in Supreme Court for New York county against the Valveless Inner Tube Co. by John W. Perry, formerly sales manager of that concern, has been discontinued. Perry had some sort of a commission arrangement and in November, 1911, sued for commissions on sales and was awarded $7,720 by a jury. The judge declared the sum too large and ordered the plaintiff to accept $604.57 or a new trial would be allowed. Before the matter came to a showdown as to whether a new trial would be had the settlement was made and the action discontinued. Meanwhile the Valveless Inner Tube Co.'s business has been taken over by the Walpole Co., of Walpole, Mass., which concern was interested in the Valveless company, originally.

Making More Room for Klaxon Horns.

When the present Klaxon horn factory in Newark, N. J., was completed, less than two years ago, it was designed to accommodate a large increase of capacity, but large as it was it has proved inadequate, and to provide the necessary expansion the Lovell-McConnell Manufacturing Co. has acquired additional real estate. Meanwhile, the power plant is being doubled in size and new machinery installed in the present factory wherever room for it can be made.

Halladay Engineer Moved to Milwaukee.

The engineering department of the Streator Motor Car Co., maker of the Halladay car, has been removed from Streator, Ill., to Milwaukee, Wis., where hereafter all new models will be built and tried out before being sent to the Streator factory to be manufactured. The Halladay department at Milwaukee will be in charge of B. F. Angar, chief engineer for the Streator company, who already has taken up residence in the Wisconsin city.

Company Formed to Market Ohio Output.

To take over and market the entire output of Ohio cars, made by the Ohio Motor Car Co., of Cincinnati, O., the Ohio Motor Car Sales Co. was incorporated last week, under the laws of that State, with $100,000 capital. The members of the two companies are practically the same, the corporators of the Sales company being as follows: C. F. Pratt, A. B. Schafer, H. T. Boulden, Jasper E. Brady and R. C. Bettinger.

Another Rubber Company in Racine.

The Western Rubber Co., capitalized at $25,000, has been organized in Racine, Wis., and will engage in the manufacture of tires, among other things, as soon as its factory is acquired. Men of prominence in Racine are interested in the enterprise, among them William Seward, who formerly was identified with the Kelly-Racine Rubber Co.

Demot Creditors Get Second Dividend.

The referee in bankruptcy of the Demot Motor Car Co., of Detroit, has declared a dividend of 4.9 per cent. Previously he had paid creditors 5 per cent., and it is possible that when the suit of the Demot Sales Co., for $22,000, is settled a further dividend will be declared. The Demot company failed for $152,000.

Judgment Against New York Tire Firm.

Judgment for $908.09 was entered last week against the Charles H. Tucker & Co., tire dealers at 1974 Broadway, New York, in favor of the United States Tire Co. The amount represents tires delivered during the months of October, November and December last, for which payment had not been made.

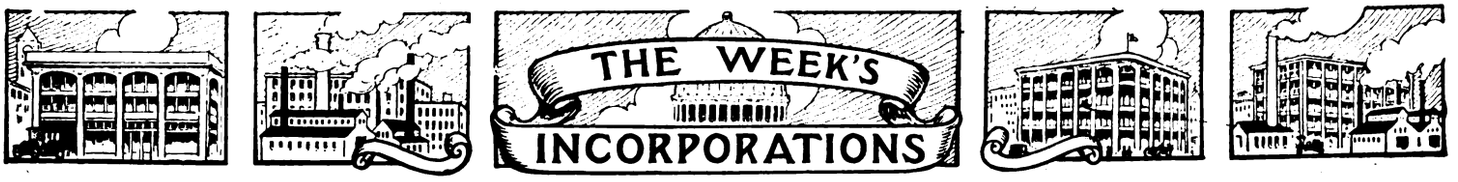
Brown Making More Room for Lamps.

The John W. Brown Mfg. Co., which manufactures automobile lamps in Columbus, O., has broken ground for a four-story, 175 x 80 feet, addition to its factory. It will be completed about July 1st.

Flanders Establishes Branch in Boston.

The Flanders Mfg. Co., of Pontiac., Mich., has opened a New England branch at 883 Boylston street, Boston. It is in charge of V. C. Cramer.

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Boston, Mass.—United Garage Co., under Massachusetts laws, with $4,000 capital; to operate a garage.

Victoria, Tex.—Victoria Motor Car Co., under Texas laws, with $5,000 capital; to deal in motor cars.

Terre-Haute, Ind.—Vigor Manufacturing Co., under Indiana laws, with $25,000 capital; to manufacture automobile parts.

Youngstown, Ohio—Poland Transit Co., under Ohio laws, with $3,000 capital; to operate conveyances. Corporators—W. F. Leedy and others.

Gary, Ind.—Garage De Lux Co., under Indiana laws, with $5,000 capital; to operate a garage. Corporators—W. R. Sharp, Laura Sharp, Roy Jaberg.

Louisville, Ky.—Commercial Motors Co., under Kentucky laws, with $10,000 capital; to deal in motor cars. Corporators—Harry D. Fitch, R. J. Hurt, R. E. Scharm.

Tampa, Fla.—Mitchell Auto Sales Co., under Florida laws, with $15,000 capital; to deal in motor cars. Corporators—M. B. Hubbell, F. M. Williams, E. Van Duzen.

Indianapolis, Ind.—White Automobile Co., under Indiana laws, with $2,000 capital; to deal in motor cars. Corporators—R. D. Eaglefield, J. H. Darlington, G. W. Fuller.

Morristown, N. J.—Spencer-Wilke Motor Car Co., under New Jersey laws, with $30,000 capital; to deal in motor cars. Corporators—E. A. Carpenter, G. B. Spencer, W. W. Wilke.

Racine, Wis.—Western Rubber Co., under Wisconsin laws, with $25,000 capital; to manufacture and deal in rubber goods. Corporators—B. F. Crandall, T. P. Hardy, William Seward.

Camden, N. J.—Point Breese Motordrome Association, under New Jersey laws, with $50,000 capital. Corporators—F. Dittmar, W. C. Sykes, Philadelphia; A. R. Sloan, Atco, N. J.

Forest City, Me.—Forest City Automobile Co., under Maine laws, with $10,000 capital; to deal in motor cars. Corporators—C. V. Robbins, W. B. Clark, J. A. Clark, J. L. Clark.

Duluth, Minn.—Zenith Tire Service Co., under Minnesota laws, with $50,000 capital; to deal in and repair tires. Corporators—Walter Wrightmeier, Harold C. Russell, Alice E. Wrightmeier.

Hartford, Ky.—Hartford Automobile and Supply Co., under Kentucky laws, with $1,000 capital; to deal in motor cars and supplies. Corporators—L. B. Bean, J. H. B. Carson, H. B. Bean.

St. Johnsbury, Vt.—Consolidated Automobile Co., under Vermont laws, with $10,000 capital; to deal in motor cars. Corporators—Howard B. Blossom, Harlan B. Howe, Mae L. Lacasse.

Buffalo, N. Y.—Pierce-Arrow California Sales Co., under New York laws; to deal in motor cars. Corporators—Walter J. Minehan, Herbert W. Huntington, Lester F. Gilbert, all of Buffalo.

Cincinnati, Ohio—Eddy Automobile Co., under Ohio laws, with $5,000 capital; to deal in motor cars. Corporators—Horace T. Eddy, Ferd. A. Wagner, A. C. Shattuck, D. M. Cox, A. C. Shattuck, Jr.

Toledo, Ohio—Disco Auto Starter Co., under Ohio laws, with $10,000 capital; to deal in motor car parts and accessories. Corporators—H. A. Cavanaugh, R. S. Holbrook, L. R. Roper and others.

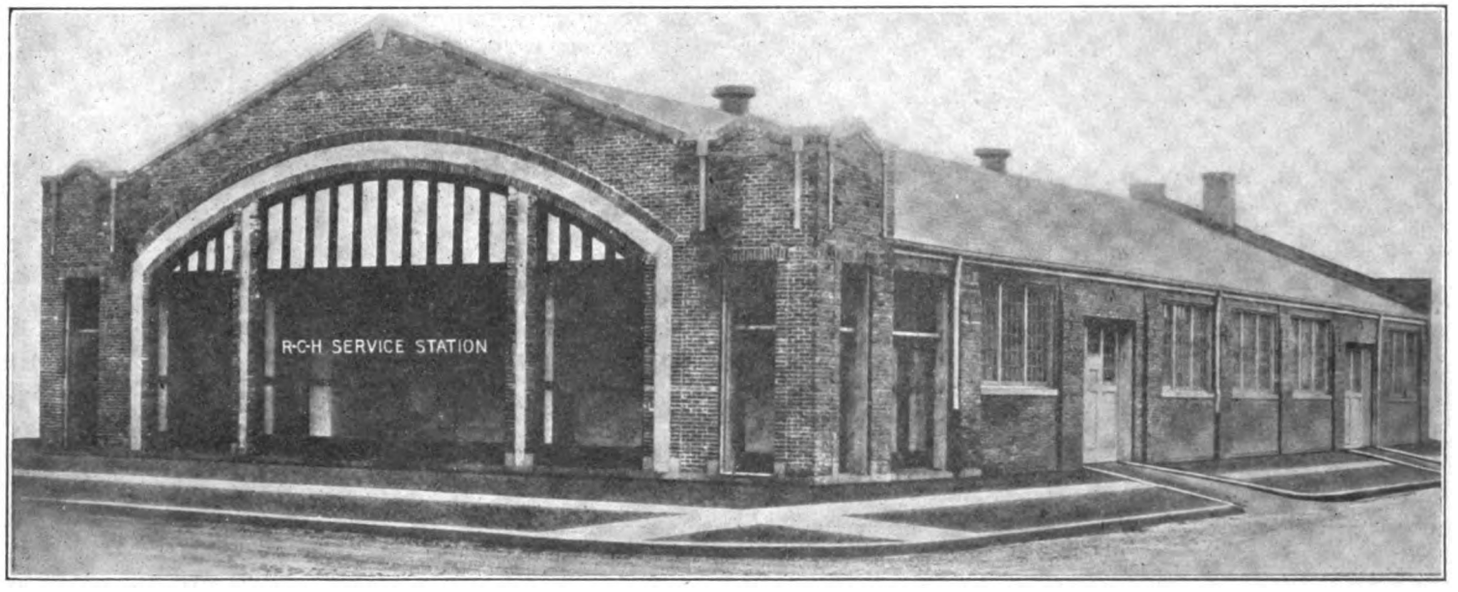
St. Charles, Ill.—St. Charles Specialty Co., under Illinois laws, with $10,000 capital; to manufacture and repair automobiles. Corporators—Lawrence H. Jensen, H. G. Hempstead, Mary M. Andrews.

San Francisco, Cal.—Electric Vehicle Maintenance Co., under California laws, with $10,000 capital; to operate a garage and charging station. Corporators—R. Schama, R. H. Robinson, O. W. Lillard.

Cleveland, Ohio—West Twenty-fifth Supply and Garage Co., under Ohio laws, with $10,000 capital; to deal in motor accessories and operate a garage. Corporators—Henry W. Lewis, T. J. McCarty, M. A. McCarty.

Cincinnati, Ohio—Ohio Motor Car Sales Co., under Ohio laws, with $100,000 capital; to manufacture and deal in motor cars. Corporators—C. F. Pratt, A. B. Schafer, H. T. Boulden, Jasper E. Brady, R. C. Bettinger.

New York, N. Y.—C. & C. Auto Co., under New York laws, with $500 capital; to deal in motor cars. Corporators—John H. Ciancimino, Elizabeth R. Ciancimino, Frank L. Ciancimino, all of 202 Carroll street, Brooklyn.



R-C-H SERVICE STATION IN DETROIT, OF THE TYPE THAT WILL BE ERECTED IN OTHER CITIES

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New York, N. Y.—Houpert Machine Co., under New York laws, with $25,000 capital; to operate an automobile repair shop. Corporators—Henry J. Houpert, Mamaroneck; Nicholas W. Durnin, 2700 Heath avenue; Stylian Carousso, 305 West 136th street.

Pelham Manor, N. Y.—Diamond Motor Car Co., under New York laws, with $10,000 capital; to deal in motor cars. Corporators—Carl W. Rundlett, Charles W. Jaycox, Sycamore Park, New Rochelle; Frank Davis, 46 Siwancy avenue, New Rochelle.

Newark, N. J.—Splitdorf Electrical Co., under New Jersey laws, with $3,500,000 capital; to manufacture motor car devices. Corporators—J. F. Alvord, Torrington, Conn.; J. Splitdorf, J. R. Viles, C. W. Curtiss, New York city; B. S. Keefer, Orange.

New York, N. Y.—Garden Taxi Cab Co., under New York laws, with $15,000 capital; to operate taxicabs. Corporators—Richard Greene, 250 West 50th street; G. Rudolph Schulze, 1421 Uyse avenue; John J. Harvey, 483 Jamaica avenue, Long Island City.

New York, N. Y.—Isotta Fraschini Motors Co., under New York laws, with $25,000 capital; to deal in motor cars. Corporators—G. Morris Herkscher, Huntington; G. Nettleton Thurner, 29 Hampton Terrace, East Orange, N. J.; C. B. Jacque, Paterson, N. J.

New York, N. Y.—Suburban Equipment Co., under New York laws, with $10,000 capital to manufacture motors, etc. Corporators—Harrison Gray Otis, 2 Rector street; Walker L. Otis, 60 Wall street; Charles A. Barker, 708 Monroe street, Brooklyn.

New York, N. Y.—Sherman Square Auto Renting Co., under New York laws, with $8,000 capital; to rent motor cars. Corporators—William MacMichael, 200 West 72nd street; William G. Johnson, 211 West 43rd street; John T. Goodwin, 550 West 184th street.

New York, N. Y.—Knickerbocker Motor Car Sales Co., under New York laws, with $10,000 capital; to deal in motor cars. Corporators—Benjamin Harris, 145 West 45th street; Robert L. Noah, 200 West 94th street; William L. Robertson, 47 51st street, Flushing, L. I.

Brooklyn, N. Y.—Sceptre Motor Co., under New York laws, with $5,000 capital; to deal in motor vehicles. Corporators—Clayton B. Ellis, 22 Jefferson avenue; William Young Chandler, 344 Washington avenue; George A. Wingate, 20 Nassau street, New York City.

Brooklyn, N. Y.—Ulmer Park Machine Works, Inc., under New York laws, with $5,000 capital; to operate a machine shop and repair motor cars. Corporators—Carl W. Lawson, 1153 51st street; Frederick W. Breiwitz, 538 50th street; Alfred Johnson, 5 Bay 38th street.

New York, N. Y.—Simplex Aluminum Solder Co., Inc., under New York laws, with $25,000 capital; to manufacture aluminum solder. Corporators—Charles B. Erkens, 255 West 43rd street; Charles Decker, 8416 17th avenue, Broklyn; Henry Bender, 74 First avenue.

Indianapolis, Ind.—Smart Auto and Manufacturing Co., under Indiana laws, with $50,000 capital; to manufacture motor cars and parts. Corporators—O. S. Srader, D. W. Reed, F. W. McCredie, O. E. Cummings, Brinay Smart, I. H. Shelton, L. B. Willis, Thomas Singleton, W. A. Virtue.

New York, N. Y.—Lippard-Stewart Motor Sales Co., under New York laws, with $25,000 capital; to deal in motor vehicles. Corporators—Thomas W. Pelham, 47 West 1st street, Boston, Mass.; Thomas W. Pelham, J., 401 Times B'ldg, New York City; Clifford E. Dunn, 50 Church street.

Changes Among Prominent Tradesmen.

D. E. Buckley has been appointed sales manager for Pratt, Carter & Sigsbee, of Detroit, who manufacture the Wolverine truck. Previously he was identified with the Abbott Motor Co.

D. Blake Battles, formerly body designer and head of the Peerless Motor Car Co.'s art department, has resigned that connection and set up for himself in the Park Building in Cleveland. He will make a specialty of body designing and automobile advertising.

B. L. Gilbert has been appointed manager of the Schacht Motor Co.'s branch in Chicago, succeeding E. W. Arborgast, who has entered the Studebaker service. Previously Gilbert was a member of the Schacht sales department at headquarters in Cincinnati.

W. D. Morgan, previously identified with the engineering staff of the Chalmers Motor Co., in Detroit, has been appointed chief engineer for the Marion Motor Car Co., of Indianapolis. He succeeds to the vacancy created when Fred I. Tone resigned several weeks since, to become chief engineer for the Willys-Overland Co., in Toledo.

N. Gould Allen, who recently succeeded C. C. Hinkley as sales manager for the Covert Motor Vehicle Co., of Lockport, N. Y., with headquarters in Detroit, has also become sales manager for the Harrison Radiator Co., of Lockport. He will direct the sales of both Covert transmissions and Harrison radiators from his office in the Ford Building in Detroit.

C. J. Reynolds, who for twenty-five years has been associated with the Studebaker interests, the last seventeen of which were spent in the purchasing department of the latter's works at South Bend, Ind., has been promoted to the post of purchasing agent of the Studebaker Corporation's automobile division at Detroit. He succeeds F. A. Wade, resigned.

B. B. Traub has been appointed Eastern traveling representative for the McIntyre Co., of Auburn, Ind., with headquarters in New York City. He will cover the territory east of Buffalo and north of Virginia. H. H. Thorpe, formerly of Detroit, but now located in Portland, Ore., has also been appointed a McIntyre representative. He will circulate in the states of Oregon and Washington.

G. H. Yeats, assistant sales manager for the Abbott Motor Co., of Detroit, has tendered his resignation, to take effect June 1st, in order to devote himself to the active management of the G. H. Y. Auto Supply Co., which he has organized and which will be ready for business on that date at 882 Woodward avenue, Detroit. Yeats has been identified with the industry for some nine years, having had experience with the Olds, DeLuxe, Packard and Buick companies.

W. H. Lally has been appointed foreign sales manager for the Studebaker Corporation, of Detroit. He has been identified with the big company for several years, latterly as European manager and chairman of the Board of Directors of the Studebaker Corporation of England, Ltd., which latter office he stills retains. Lally has spent the greater part of the last few years abroad, during which period he organized the English Studebaker company and established the Berlin branch, his travels carrying him not only through Europe, but into India and the Far East generally.

Shaffer Takes Agency Contract to Court.

Because of his belief that he is entitled to a return of all except $100 of the sum of $3,000 which he deposited late in 1910, to secure the agency for a large slice of Eastern territory for the American underslung car, of which amount but $1,000 has been paid him, Charles W. Shaffer has entered suit for $4,087.50 in the Supreme Court for New York County against the American Motors Co., of Indianapolis, Ind., which case is on the current calendar. The remainder of Shaffer's claim is made up of a sum which he alleges is due him for commission on two cars which were sold in his territory without his authority.

Shaffer's contract, which was executed with the American Motor Car Co., called for thirty cars, of which four were to be shipped him within a given time. But one was forwarded, however, and he declined to accept it. In January, 1911, when the American Motors Co. succeeded the American Motor Car Co., Shaffer claims that two cars were sold in his territory. He, therefore, makes a demand for the commissions thereon and for a return of the amount of his deposit, less $100 for the car which was tendered him, and the $1,000 which was returned to him.

To Make Baker Electrics in Canada.

To reproduce the Baker electric vehicles on the other side of the border, the Baker Motor Vehicle Co. of Canada, has been incorporated with $100,000 capital and will erect a plant in Walkerville, Ont. The interested men are J. H. Walker and H. H. Walker, of Walkerville, W. H. C. Burnett, of Detroit, F. R. White, R. C. Norton, G. H. Kelly and O. B. Henderson, of Cleveland.

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George Gaughe is building a garage in Lead, S. D.

Harry Brown is erecting a garage in Hearne, Tex.

Colvin Morrill, of Danville, Vt., is erecting a garage.

Ernest Scharfe is about to engage in the garage business in Hendricks, Minn.

The John F. Anderson Garage is the style of a "new one" in Armour, S. D.

Arthur G. Storz has opened an automobile supply store in Farnam street, Omaha, Neb.

A garage has been opened at 59 Boylston street, Cambridge, Mass., by W. S. Sanderman.

Clyde M. Hare has opened an automobile supply store at 72 East Main street, Newark, Ohio.

The Gibson Automobile Co., of Indianapolis, Ind., has filed formal notice of its dissolution.

A. E. Whiting, Lake Crystal, Minn., has let contracts for a garage building; it will be 80x24 feet.

W. H. Thompson is to build a three-story garage in Norwalk, Conn. It will be 40x75 feet.

The Genesee Automobile Co. has been organized in Utica, N. Y. It will handle the Mercer line.

George Eifers and Lawrence Crabtree have embarked in the garage business in Tottenville, N. Y.

W. S. Battersby and E. W. Taylor, in Miller, S. D., have bought the garage business of Joseph Wolfe.

C. L. Foster, of Waverly, Kan., has sold a half interest in his automobile and garage business to L. E. Saxton.

The Goodyear Tire & Rubber Co. has opened a new branch in Syracuse, N. Y., at 426 South Warren street.

E. A. Edwards has opened a branch of the Moon Motor Car Co., in Philadelphia, Pa., at 1927-29 Market street.

Under the firm style, Betz & Frambes, H. E. Betz and J. C. Frambes have started a garage in West Union, Ohio.

The J. F. Jacobson Implement Co. of Madison, Minn., has "taken on" automobiles. It has the Studebaker agency.

John H. Maybee, hotel proprietor in Canton, N. Y., is to build and operate a two-story garage in the rear of his hostelry.

Henry S. Beidler, of Doylestown, Pa., is to build a brick garage and engage in that line of business. The garage will be 30x50 feet.

A new $20,000 garage, just completed in Grand Island, Neb., has been leased and will be operated by E. A. Brandes of Hastings.

J. A. Marshall & Co., implement dealers in Manito, Ill., have "gone into" automobiles. They will do a general garage business.

Henry and Elmer Knowlton have engaged in the automobile business in Canton, S. D. They will handle the Hupmobile cars.

Cuneo & Podeste are about to construct a three-story garage at 73-75 Washington Square, New York City. The cost will be $20,000.

F. A. Davis, Seattle, Wash., has secured permission to build a three-story brick garage at 901-11 Pike street. It will cost $25,000.

The Chapman-Love Auto Co. has been formed in Washington, D. C., to handle the King car. Quarters have been secured at 1312 14th street.

Authority has been granted Hayes & Kirstead, 590 Valley road, Montclair, N. Y., to erect a garage. It will be 49x74 feet and will cost $3,200.

The Anaheim Motor Co., recently organized in Anaheim, Cal., with $50,000 capital, is having a $6,000 garage built on South Los Angeles street.

The National Auto Supply Co., with quarters at 77 Chambers street, New York city, has established a branch at 261 Halsey street, Newark, N. J.

Alfred and Victor Nelson, blacksmiths in Milbank, S. D., are building a one-story garage adjacent to their "smithy"; it measures 45x50 feet.

Harry N. Burton and O. B. Johnson are about to open a garage at Fifth street and D streets, Chino, Cal. They will also conduct an automobile livery.

J. R. Braidwood and A. W. Chisholm have formed the Five Points Auto Co., in Fort Smith, Ark. They will operate a garage in North A street.

Charles Alexander and William Keegan, of Globe, Ariz., have formed a partnership and will sell E-M-F and Flanders cars in Gila and Graham counties, Ariz.

Plans are under way for the organization of a $50,000 company to be known as the Peerless Sales Co., and which will handle Peerless cars in Cincinnati, Ohio.

The Twyman Motor Car Co., of Columbus, O., agents for the E-M-F and Flanders cars, has opened a branch in Dayton. It is located at 224 North Main street.

Permission has been granted by the authorities of Springfield, Mass., to Charles H. Alderman for the erection of a concrete garage at 400 Dickinson street.

The Michigan Motor Car Co. has been organized in Boston, Mass., to handle automobiles built by the Michigan Buggy Co. It is quartered at 357 Boylston street.

The Automobile Devices Co. has been formed in Milwaukee, Wis., to handle accessories. C. H. Delafield is president. It is located at 686-90 National avenue.

Moses Johann has secured authority to build a one-story brick garage, 38x105 feet, in Baltimore, Md., on Whitelock street, near Calhoun street. It will cost $4,500.

E. L. Black, dealer in automobile supplies at 155 North Emporia avenue, Wichita, Kan., has filed a voluntary petition in bankruptcy. Liabilities are $7,300, assets $247.10.

Samuel F. Eisenbrown, of Reading, Pa., is building a garage on Lincoln street between Douglass and Windsor streets. It will be known as the Point Breeze Garage.

N. A. Lord, of the Lord Automobile Co., of Los Angeles, and J. E. Tomlison, also of Los Angeles, are to establish au automobile supply house in San Bernardino, Cal.

Franklin, Minn., is soon to be possessed of a new concrete garage, 40x80 feet. Henry Halvorson, J. J. Anderson and Henry Steele are the men who will operate it.

W. H. MacLain, of Exeter, Tulare county, Cal., is about to enter the automobile field. He has secured the agency for R-C-H cars in the northern half of his county.

Berthold L. Toplitz, formerly an automobile dealer in New York City, has been granted a discharge from bankruptcy by the Federal Court. His liabilities were $16,952.

The Southern California Edison Co., of Santa Monica, Cal., has been granted a permit to build a one-story, reinforced concrete garage and warehouse; it will cost $10,000.

The Everitt Sales Co. has been formed at Atlanta, Ga., to take over the business of the Georgia Motor Car Co. It is virtually an Atlanta branch of the Metzger Motor Car Co.

Mack & McCormack is the style of a new firm which just has commenced business in Johnstown, Pa. In addition to selling Warren cars, a general garage business will be conducted.

An all night taxicab service is the feature of a garage and automobile livery business to be launched in Utica, N. Y., by the Smith Livery Co. It will operate at 16 Main street.

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Headed by J. H. Edwards, of Jersey City, the Edwards Motor Car Co. has embarked in business at 223 Halsey street, Newark, N. J. It will handle the Pathfinder car in northern New Jersey.

Doran Bros., plumbers, in International Falls, Minn., are planning to enter the garage business also. They are building a structure for this purpose at the rear of their present quarters.

Roy W. Hutchins is preparing to open a garage and sell Marathon cars at Ninth and Chillicothe streets, Portsmouth, Ohio. He is remodeling a skating rink.

C. Barnum Seeley, of Bridgeport, Conn., is erecting a garage on State street. It will be of concrete and steel, 52 x 104 feet, and when completed will be occupied by the Ashton Motor Car Co.

The Swinehart Tire & Rubber Co., of Akron, Ohio, has established a branch at 102 North Pryor street, Atlanta, Ga., C. E. Holmes in charge. The branch will distribute to the entire South.

Instead of having bought a half interest in the Krit agency in Salem, Ohio, as previously reported, H. L. Slagle, the proprietor, states he has sold a half interest because the volume of business necessitated a partner. The partner is E. W. Harshman, a groceryman, who was obliged to give up that business because of his health. The firm will be known as H. L. Slagle & Co. A new garage is being built.

Morgan & Wright Fight for Right of Way.

To enforce its claims to a right of way, 45 x 500 feet, Morgan & Wright, of Detroit, has instituted proceedings in the Wayne County Chancery Court, in that city, against the Wadsworth Real Estate Co. and Hugo Scherer. If the action results successfully, it will require that the defendants remove buildings which they have erected on the land, and which it is claimed constitute an obstruction that has caused damage to the Morgan & Wright interests, although no specific amount of damage is named in the complaint. It appears that when Morgan & Wright purchased their property in 1905 they were granted perpetual and free right of way over certain property belonging to the Olds Motor Works, in consideration of the conveyance to it of a right of way over certain other property since acquired by Morgan & Wright. The latter declare that they have adhered to this agreement but that later in 1905 the Olds Motor Works sold its land to the defendants, who, in due course, and against the protest of Morgan & Wright, erected buildings in violation of this right of way. As the land involved is very valuable, the suit probably will be bitterly contested.

Recent Losses by Fire.

Ellenville, N. Y.—C. J. Burhans, Main street, automobile repair shop, contents destroyed, building damaged. Loss, unknown.

Clinton, Ia.—Thomas Automobile Garage, 412 Scott street, damaged. Loss, $200.

TO INCREASE CAPITAL TO $120,000,000

First Steps Taken by United States Rubber Co.—20 Per Cent. "Melon" and Biggest Tire Factory in Prospect.

Expressing his belief that the tire business is "still in its infancy" and, therefore, advocating that the United States Rubber Co.—which owns the tire company of the same name—immediately construct the "largest and best tire plant in the world in order to meet the growing demands for our tires," Samuel P. Colt, president of that mammoth corporation on Tuesday last, 21st inst., at its annual meeting in New Brunswick, N. J., advised the stockholders to approve the plan for refinancing the corporation which had been submitted by the directors, which recommendation there is no doubt will be adopted.

It provides for an increase of the capital from $75,000,000 to $120,000,000, of which $80,000,000 will be preferred and the remainder common stock. Out of the added $15,000,000 common and $30,000,000 preferred, provision will be made as follows:

1. Common stock dividend of $5,000,000, or 20%, upon the present outstanding common stock; a dividend which will be warranted by the company's surplus.

2. An offer ratably to all stockholders of $10,000,000 first preferred stock at par and accrued dividend.

3. An offer to the holders of second preferred stock of an opportunity for an exchange of their present stock on the basis of 100 shares of second preferred stock for 75 shares of first preferred stock.

When this plan is carried out there will be issued and outstanding $57,500,000 preferred stock and $30,000,000 common stock, leaving unissued $22,500,000 preferred stock and $10,000,000 common stock. The company thereafter to have two instead of three kinds of stock.

Of this preferred stock the $2,500,000 gained through the retirement of the second preferred stock would be available (without exceeding the two to one requirement of the Jersey law) for offer if deemed advisable for the minority holding of the Rubber Goods Manufacturing Co. stock.

The $20,000,000 preferred stock and $10,000,000 common stock then remaining would be available for future uses of the company.

The result of these operations would be to obtain $10,000,000 additional cash for the United States Rubber Co. in a way giving ratably to the stockholders the benefit of the premium on the $10,000,000 preferred stock.

The annual meeting will be reconvened at the company's office in New Brunswick on May 31 for an informal vote on these propositions.

If the plans are approved then by a stock vote, directors will call a special meeting of stockholders necessary to carry its proposed plan into effect; and then or thereafter submit a further plan for the refunding of all existing obligations of the company and its subsidiaries, and adequate provision for future needs of the organization.

In his address to the stockholders, President Colt, without mentioning names, remarked the Goodrich-Diamond transaction as one of the things tending to confirm the suggestion contained in his annual report that the rapid expansion of the business of the company would require further financial provision. He termed the Goodrich-Diamond affair the "unexpectedly sudden development of large and combined competition which imposes upon your officers a duty of vigilant and active effort to maintain and extend your business."

The further plan of financing, referred to by President Colt, in addition to the stock increases, will consist of the authorization of a large bond issue, sufficient to provide for the company's refunding requirements and other needs for many years to come. The exact amount of the authorization has not been determined, but it may be $50,000,000 or so, or possibly larger, depending upon future estimates as to the company's requirements.

It is not planned to sell any of the proposed new bonds in the near future, and they probably will not be offered for sale until fall.

Certain minority stockholders, represented by Samuel Hyman, entered a protest against the approval of the president's report. These stockholders have instituted suit in the New York Supreme Court, which aims to investigate the payment of $731,289 of the earnings of the Revere Rubber Co., under an old contract, to a syndicate of which President Colt was the manager. These stockholders claim that the Revere transaction was illegal and that Colt and his colleagues violated their trust in appropriating the amount to the syndicate.

New Company Buys Sellers Business.

Angel Anfador and other residents of Peru, Ind., have formed the Central States Engineering Co., in Hutchinson, Kan., and having acquired what formerly was the Sellers automobile plant will continue the business of that concern in addition to manufacturing among other things a novel type of automobile clutch, the smallness of which is not its most noteworthy feature. In addition to Angel Anfador, the corporators of the company are H. O. Gunderson, A. A. Miller and A. J. Anfador.

Goodyear Still Adding to Its Plant.

Ground has been broken for still another addition to the Goodyear Tire & Rubber Co.'s plant in Akron, O. The new structure will be 405 x 79 feet. At the same time, one of the old buildings will be remodeled and have two stories added to it, which will make it a five-story structure, 296 x 60 feet.

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THE MOTOR WORLD

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THE MOTOR FOR AGRICULTURAL USAGES.

It probably is not putting the matter too strongly to assert that the motor industry is hesitating on the threshold of a trade that, once developed, will be far more extensive than even the traffic in pleasure cars, for the reason that it will deal, not with luxuries, but with necessities—that is to say, with agricultural motor tractors. And there would seem to be reason for the belief that the type of internal combustion motor that will drive such tractors will differ in many respects from the typical pleasure car motor; that it will be of the least possible weight compatible with ample strength, will have no parts that are not absolutely essential to its operation and will be cheaply operated, not because of extremely high thermal efficiency, but because of the use of some liquid fuel, the cost of which will be considerably less than that of gasolene.

A tractor designed to haul plows and other field implements must be of reasonably light weight, for it will be called upon to traverse much soft, rough ground; the field of usefulness of a very heavy machine is limited to ground of some degree of firmness. Weight is not necessary to traction, as cleats or other kinds of anti-slip devices can be used without restriction. It is not to be expected that farmers will acquire engineering educations along with their tractors, or that they will manifest any willingness to hire high-priced mechanics to drive and care for them. Time cannot be wasted on the machines, which, therefore, must be sufficiently rugged and simple to require a minimum of attention, just as the steam engines and stationary motors built especially for farm work have been developed to meet these conditions. While considerations of lightness and simplicity cannot be permitted to interfere with such essentials as power and reliability, they well may be developed at a slight expense of thermal efficiency for the simple reason that, as low fuel expense will be a matter of prime importance, an inexpensive hydrocarbon will fill the tanks.

Though at the present moment there does not seem to be on the market a motor that quite fulfils all these conditions, it would appear that a good start has been made and a foundation laid in the air-cooled two-cycle motor—a type of motor that is attaining a marked degree of favor notwithstanding considerable opposition, much skepticism and as much ridicule. The adaptation of this class of prime mover to farm tractor work is merely a question of the application of brains, energy and capital, and the same holds true with regard to the evolution of a satisfactory method of using fuels that are cheaper and at the same time less volatile than gasolene, such as distillate, alcohol and kerosene. All the problems involved have been studied, and are being studied, and will soon be much further investigated, and finally solved. As a matter of fact, the difficulties that must be overcome in order to evolve a really practical motor farm tractor, capable of general application, are no greater than, if as great as, the difficulties that already have been overcome in bringing the prevalent type of gasolene motor to its present state of efficiency. And the field of usefulness is so vast and so rich that the effort is well worth while.

PSYCHOLOGICAL EFFECT OF HIGH PRICE.

It is a contradictory state of affairs that exists, despite every reason why it should not exist, that while the most expensive motor cars are given the most careful attention, quite as a matter of course, cars of the moderate priced class, comparatively speaking, are more or less neglected, if not actually abused, though they reasonably may be expected to require more care and attention than higher priced and presumably better machines.

The reason, of course, is not far to seek. A car soon ceases to be a novelty, and though the owner's avidity for keeping the mechanism clean and in adjustment dwindles, his proclivity for driving remains unabated. Some cars will stand an amount of mistreatment that is nothing short of surprising; but if it is persisted in there can be but one ending, and a most unsatisfactory one.

There is another phase of the matter. When a car that is driven a great deal and groomed very little finally shows signs of distress and gives trouble, as it inevitably must, nothing is more natural or easy than to condemn the machine rather than to place the blame where it belongs. This is an injustice to the car and to its builders, and it is very likely to—and does—give erroneous impressions of the value of such machines. It is fairly certain that if as much care were lavished on the lower-priced cars as is given the high-priced ones—even by men who own both—the results would prove uncommonly instructive. It is the care they receive that assists to preserve the reputations of the expensive creations. That they receive so much and such intimate attention probably is one of the wholesome psychological effects of price that cannot be overcome or counterbalanced.

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STRIKING AT PAYMENT OF GRAFT

Repairer Who "Whacked Up" With Hearn's Employes Sued—Unusual Litigation.

Although they have won the first two rounds, and it is unlikely that they will recover the full amount for which they have sued, it is certain that if James A. Hearn & Son, the New York drygoods house, obtain a substantial verdict in the action which they have pending against George Schuchman, the payment of graft to employes will be proven expensive and will receive discouragement all along the line.

Schuchman, who is a repairer of wagons and automobiles, is charged with having entered into an agreement with two of the Hearn employes whereby they obtained a rake-off of 10 per cent. on all work which he performed for the firm, which rake-off during a period of four years, amounted to $4,146.65. At the end of that time, the Hearns discovered what was going on and entered suit under the New York Anti-tipping law, not merely to recover the amount of the graft, but the entire payment which they themselves had made to Schuchman for the work he performed, $41,469.46. Their motion for judgment on the pleadings was granted, but Schuchman carried the case to the Appellate Division of the Supreme Court, demurring to the complaint on the ground that it did not state facts sufficient to constitute a cause of action.

With Justice Dowling dissenting, the Appellate Division, however, just has sustained the order of the lower court, although in doing so the four agreeing justices, Ingraham, McLaughlin, Clarke and Scott, state that it is not likely that the full amount claimed can be recovered. Their opinion in full is as follows:

"The plaintiffs are merchants having occasion to use in their business delivery wagons and automobiles. The defendant is and has been, between the dates mentioned in the complaint, a builder and repairer of such vehicles. Between June 4, 1907, and February 28, 1911, plaintiffs had in their employ George Reinemann and Frank Kelsey, who were authorized to purchase and contract for plaintiffs and to employ service and labor for them. It is alleged that between the dates aforesaid a corrupt, illegal and criminal agreement was made, without plaintiffs' knowledge, between said Reinemann and Kelsey on the one hand and defendant on the other, wherein and whereby the said defendant offered and agreed to give to said Reinemann and Kelsey, for themselves, a commission, discount and bonus upon the price and amount paid for all materials, supplies and other articles which should be purchased by said Reinemann and Kelsey for the plaintiffs, and upon the amount and price paid for services and labor employed from said defendant by the said Reinemann and Kelsey for the plaintiffs, and said Reinemann and Kelsey agreed to receive for themselves such commission, discount and bonus. It is then alleged that between the dates specified said Reinemann and Kelsey, for the plaintiffs, procured and purchased wagons, automobiles, materials and supplies, and had work and labor done by way of repairing amounting in the aggregate to $41,469.46, which plaintiffs paid to said defendant, and thereupon said defendant in fulfillment of said corrupt agreement paid to said Reinemann and Kelsey a commission, bonus or discount amounting to about $4,146.65.

"There are numerous other allegations in the complaint designed to bring the case within the terms of Sec. 439 of the Penal Law, which makes such an agreement as is set forth in the complaint unlawful and criminal. The theory of the complaint is that, because defendant's acts in paying bribes to plaintiff's servants were unlawful, and, if known to plaintiffs before they had paid anything to defendant, would have furnished a defense to an action by him (Sirken v. Fourteenth Street Store, 124 App. Div., 384), therefore plaintiffs may now recover the sum so paid in an action for money had and received, which defendant in equity and good conscience ought to return. Plaintiffs, therefore, seek to recover the whole amount which they have paid to defendant between the dates named in the complaint. The Sirken case, upon which plaintiffs rely, does not go to the extent of justifying a recovery of all the money paid. It went no further than to hold that the courts would not aid a seller who had been guilty of violating the law, but would leave him where he had put himself.

"An action to recover back moneys already rests upon a wholly different foundation. Its gravamen is that the plaintiff has been damaged by the unlawful acts of the defendant, and the most that the plaintiff can recover is the amount of his damage, being the difference between what he ought to have paid and what he did in fact pay, for, of course, in the present case the plaintiffs cannot return what they have received from the defendant and rescind the contract. The plaintiffs cannot therefore recover the whole amount paid to defendant.

"The demurrer, however, is to the effect that the complaint states no cause of action, and it cannot prevail if there be any cause of action stated, even if it be for a less amount than that for which plaintiff prays judgment, for the prayer does not determine the sufficiency of the complaint (Wetmore v. Porter, 92 N. Y. 96). It is alleged that as an incident to and embraced in the corrupt and unlawful agreement above recited, it was further agreed, and the agreement was carried out, that unnecessary materials and work should be ordered and purchased, that excessive and extravagant prices should be charged, and that false charges should be made against plaintiffs for supplies and materials never furnished, and in divers other ways by collusion and conspiracy between the said employes and defendant the plaintiffs were cheated and defrauded. These allegations, in my opinion, set forth a cause of action justifying a recovery, although doubtless not for the full amount claimed in the complaint. If a complaint sets out a good cause of action it is proof against a demurrer for insufficiency, notwithstanding it may be inartificially framed or might have been obnoxious to a demurrer on other grounds. For this reason the order appealed from should be affirmed, with leave to defendant to withdraw his demurrer and answer within twenty days upon payment of costs in this court and in the court below."



May 25, Newark, N. J.—Motor truck parade under the auspices of the Newark Automobile Dealers' Association.

May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

August 26-31, Chicago, Ill.—Chicago Automobile Trade Association's first outdoor show.

September 2, Indianapolis, Ind.—Track races.

Small Truck Maker Seeks New Site.

The Seamless Pressed Steel Co., which has been producing motor trucks on a small scale in Redkey, Ind., is seeking to expand, and to that end has made a proposal to the Merchants' Association of Hartford City, Ind., to remove to that place. The proposal requires that the Hartford City people purchase about $25,000 worth of stock, but no definite action has yet been taken.

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MILWAUKEE DESIRES TO UNLOAD

Finds Two Big Races Too Much and is Willing to Surrender Grand Prize—Pabst Offers New Trophy.

Despite the fact that Milwaukee, Wis., has been awarded the privilege of staging both the Vanderbilt and Grand Prize races, there is a bare possibility that either one or the other of the races may go to another city in another State. According to advices which are to be relied on, the Milwaukee Dealers' Association, which has the projects in hand, has requested the Chicago dealers' association to take one of the races off their hands, owing to difficulties encountered in financing the venture, and in consequence it is not unlikely that the Grand Prize race will be run on Illinois territory, the Milwaukee dealers having shown a desire to retain the Vanderbilt.

As a matter of fact, no course has been selected as yet, nor have any definite dates been decided upon for either of the races. The contest board of the American Automobile Association has insisted that at least three days must intervene between the running of the two races, and tentatively has suggested to the promoters that one of the races be run on Sept. 17th and followed by the other on the 21st. It is not suggested or specified which race must be run first, though it is definitely stated that no sanction will be issued for the Vanderbilt until the date for the Grand Prize has been made known by the Automobile Club of America. Furthermore, the contest board has indicated that no sanction for either race will be issued unless the dates suggested are later than Sept. 17th. However, the sanction for the Vanderbilt has not been applied for as yet.

Despite the fact that affairs still are in more or less of a muddle, active preparations for staging the Vanderbilt cup race on Wisconsin soil are being made. The committee which has charge of affairs has decided to finance the erecting of an immense grandstand at the finish line, to seat upwards of 60,000 persons, and at other points along the course other stands or "bleachers," accommodating some 24,000 additional spectators, probably soon will go up.

In addition to the coveted Vanderbilt cup, and the money consideration which goes with it, two other valuable prizes have been hung up. Col. Gustave Pabst, whose fame as a maker of beer has spread far and wide, has donated a trophy, to be known as the Babst Blue Ribbon trophy, though it is unlikely that contestants in the Vanderbilt race will be able to try for it. It is said that the prize will be offered for an annual race under national or international colors, for cars not eligible to participate in the Vanderbilt race.

Whether or not this means the Grand Prize race is not divulged. However, the trophy actually has been donated, even though the terms of competition have not definitely been decided, and the $2,500 prize will be split up between the manufacturer of the car, who will receive some sort of a cup, and the driver of the car, who will receive a miniature beer barrel containing an unknown number of shiny $20 gold pieces.

The other prize has been styled the Wisconsin Motor trophy and has been donated by the Wisconsin Motor Mfg. Co. It is for a light car race to be run in conjunction with the Grand Prize, and consists of a trophy standing some 40 inches in height and valued at $1,500. Like the Pabst trophy, it will be a perpetual challenge cup to be held until won.

Speedway "Mystery" Finally Revealed.

Whether or not those who expected a veritable speed monster to materialize on the Indianapolis Speedway on Decoration Day in the guise of the "Mysterious No. 26," the entrant of which up to the present time has successfully stood off a host of embryo Sherlock Holmeses in their endeavors to learn something of the car and himself will be disappointed or not remains to be seen. The identity of both the owner and the car at last have been revealed. The former is one Charles Shambaugh Lafayette and the car is an old Buick racing machine which once had four cylinders, but which in the course of reconstruction has acquired two more. Just who will drive the car is as much a mystery as ever, however, as so far no one has been nominated.

Detroit Likely A. A. A. Starting Point.

It is altogether probable that Detroit, which at one time seemed a very likely starting point for the American Automobile Association's national reliability tour, hitherto styled the Glidden tour, really will be the starting point after all. At any rate Indianapolis is out of the running, so to speak. Though the Michigan city has been practically decided upon, it is stated by officials of the A. A. A. that nothing absolutely definite can be announced before Saturday next. As originally scheduled, New Orleans retains the honor of staging the finish.

Author President of 50,000-Mile Club.

Lee Meriwether, the first motorist to qualify for one of the gold medals offered by the Maxwell-Briscoe Motor Co. to all Maxwell owners who have traveled 50,000 miles or more, has been designated president of the 50,000-Mile Maxwell Motor Club. Meriwether has a reputation as a tourist and author, one of his works being "Seeing Europe by Automobile."

Mercer County Motorists Choose Officers.

The Mercer County, Ill., Automobile Association has elected the following officers: president, K. M. Whithan; treasurer, C. A. Beers; secretary, E. T. Carlson.

FINE OLD ROW DEVELOPS IN OHIO

Bonafield's Alleged "Boss Cox Methods" Elect His Ticket but Split the State—New Association Now Forming.

That portion of Ohio which surrounds and clings to the person of Dr. C. L. Bonafield, of Cincinnati, and which for at least two years has been bent on raising ructions in the American Automobile Association, finally has achieved that end. Justly or unjustly, Bonafield is credited with being possessed of a keen itch for office and as representing a disturbing element. At the annual meeting of the Ohio State Automobile Association, which occurred in Kenton on Saturday last, 18th inst., those who sought to end the turmoil, brought forward Fred C. Wood, of Cleveland, as a candidate to succeed Bonafield as president of the State organization, and Fred C. Caley, also of Cleveland, to oppose the re-election of Bonafield's candidate for that office.

Bonafield knew what was coming and laid his plans accordingly. Several clubs sprung up almost over night in the vicinity of Cincinnati, and all of their delegates were pledged to Bonafield, which is not strange, seeing that the Bonafield element is charged with being responsible for the birth of the "mushroom" clubs. At the Kenton meeting, however, Bonafield secured the recognition of these delegates, and by other arbitrary rulings, which are described as being akin to "Boss Coxe's methods," the Bonafield ticket was re-elected.

Disgusted by the tactics that prevailed, the anti-Bonafield element bolted the meeting and issued a call for a meeting in Cleveland, at which a new State body, which probably will be termed the Ohio Motor Federation, will be formed, and which will apply to the A. A. A. for affiliation and formal recognition. It is stated that 14 of the 18 clubs represented in the present State body will constitute the new organization. They include the cities of Cleveland, Columbus, Youngstown, Canton, Akron, Norwalk, Elyria, Ashland, Wadsworth, Ravenna and Steubenville. Charles C. Janes, of Columbus, probably will be the president of the new federation.

In addition to Cincinnati, the clubs that are standing with Bonafield are those located in Dayton, Springfield, Kenton and Athens.

It was after the bolters had left the meeting, amid the jeers of the Bonafield element, that the latter elected officers, as follows: President, Charles L. Bonafield, of Cincinnati; first vice-president, William Stroup, of Dayton; second vice-president, E. E. Kelly, of Springfield; third vice-president, L. S. Bixler, of Kenton; secretary, Dr. A. B. Heyl, of Cincinnati; treasurer Prof. Fred Mercer, of Athens, O.

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TRUCK RULES BROUGHT UP TO DATE

More Elastic Speed Limits and Greater Latitude Generally Provided For—Registration Requirement Eliminated.

After having been in force for just one year, the rules governing commercial car demonstrations which were formulated last May by the Manufacturer's Contest Association and adopted and promulgated by the American Automobile Association, have had the searchlight turned on them and a number of important alterations are revealed in the revised edition which just has been made public by the Contest Board of the A. A. A. Except in one or two instances, however, the changes which have been made are not drastic and have to do principally with the classification of vehicles, the speeds and the tire penalties. Otherwise the rules are much the same and as heretofore follow closely the rules governing pleasure car contests to which they have been made supplementary.

As heretofore, there are 12 classes, divided according to capacity, though a general revision of the scale has been made. Division 1K now is for vehicles carrying up to 1,000 pounds, instead of 500 pounds, and the capacity of the other divisions has been boosted accordingly, trucks carrying between 16,001 and 20,000 pounds now coming in Division 12K. No provision is made for vehicles of greater capacity, though Division 12K under the old rules included vehicles of over 20,000 pounds capacity.

The table of speeds has received the most drastic alteration of all the rules and instead of stating that "the following average speeds shall be maintained in the respective divisions during demonstration," as the old rules did, the new rules do not specify that the speeds must be adhered to. Instead, the speeds are "recommended for the consideration of promoters." The new table is as follows:

Division	Inter-City	Suburban	Congested Traffic Dist.
	Miles per Hour		
1-K	16	12	10
2-K	16	12	10
3-K	15	12	10
4-K	15	10	9
5-K	13	10	9
6-K	12	10	9
7-K	11	10	9
8-K	10	10	9
9-K	9	9	8
10-K	8	8	8
11-K	6	6	6
12-K	5	5	5

For the edification of those who might stumble over the correct interpretation of the rules it is explained that "Inter-City" means demonstrations held over open roads between cities; "Suburban" means demonstrations held partly in traffic districts and partly in residential districts; and "Congested Traffic Districts" means the heart of the business sections in cities where traffic is maximum.

Grade 3, which provided for demonstrations in which time penalties are imposed and a record is taken of the gasolene oil or electric current consumed and the cost of same used to determine the fuel efficiency of the vehicle, have been eliminated and hereafter there will be but two grades, namely, 1 and 2, which remain unaltered. At the option of the promoter in demonstrations of either grade, however, a record of fuel consumption may be kept and the resultant fuel efficiency figure used in determining the final standing of the vehicles.

The weighing requirements remain the same except that the entrant is required to file with the Contest Board a certificate of inspection of the scales used. Though the old rules stated specifically that "only registered vehicles shall be eligible to compete in sanctioned demonstrations," the new rules say nothing whatever about the requirement for registration and merely stipulate that the entry blank must be accompanied by the manufacturer's catalog. It is further stipulated that each vehicle must carry at all times during the demonstration its full lamp equipment and also a horn.

Regarding tire penalties, the old rules stated that while no tire repairs or replacements would be penalized they must be made in the running time of the car, no allowance to be made for time lost. The new rules are quite different and state that there shall be no penalties for tire repairs and that the time lost shall be added to the day's running time, provided the lost time does not exceed a maximum of six hours, after which penalties will be charged for lateness at control. Wheels equipped with solid rubber tires without demountable rim equipment may be exchanged on the same basis as the replacement of pneumatic tires or solid rubber tires with demountable rim equipment and the time consumed in making repairs and replacements will be added to the daily running time.

Except for the addition of a single Rule, No. 486B, under road regulations, which states that during demonstrations the heavier vehicles on the slower schedules must give way to the lighter vehicles on the faster schedules, the remainder of the rules are unaltered.

Denver's "Sociability Tour" is Deferred.

Due to recent heavy rains which have made fair morasses of the roads, the Denver-Chicago reliability-sociability tour which was scheduled to have started from the Colorado city on Tuesday, 21st inst., has been postponed and unless further changes in the plans are made will be started on June 25th. Already some 25 entries have been received by the Denver Chamber of Commerce, which with other civic bodies has the run in hand, and it is expected that by the time of the start the number will have been swelled to at least 50. Originally New York was named as the destination, but the distance proved undesirable.

DISBROW TROUPE SHOWS IN DENVER

Disbrow Himself Plays the Stellar Parts But No Overwhelming Crowd Attends —Records Escape Unscathed.

Accompanied by Neil Whalen and Joe Nikrent and a "stable" of racing cars, Louis Disbrow invaded Denver, Col., on Saturday and Sunday last, 18th and 19th insts., on his tour of some of the Western states in emulation of another more or less noted driver who in days gone by was famous for his barnstorming proclivities and by way of demonstrating that he really is "some driver," Disbrow carried away the lion's share of the prize money in the two-day meet which was held on the old driving track at Overland Park. Of course he was the main attraction and furnished most of the thrills. He fulfilled his part of the contract and at the wheel of the reconstructed Fiat which goes under the appellation "Jay-Eye-See" he drove fast enough and raised dust enough to satisfy most of those in the slender crowd that turned out to see him drive.

If there was disappointment it probably was because no records or "near" records were shattered and only a single accident of little consequence occurred. Joe Nikrent was the unlucky driver, a stone being thrown through his goggles in one of the races and inflicting painful though not very serious injuries. Local talent was noticeably lacking and what little there was showed to no advantage against the experienced drivers. The summaries for the two days are as follows:

Saturday, May 18.

One-mile time trials—Won by Louis Disbrow, Simplex, time, 56⅗; second, Neil Whalen, Case; third, Joe Nikrent, Case; fourth, Peyton Hough, Ford.

Three-mile three-cornered race—Won by Louis Disbrow, Case; second, Neil Whalen, "Little Giant"; third, Joe Nikrent, Case. Time, 3:44⅗.

Five-mile class E handicap—Won by Neil Whalen, Case; second, Joe Nikrent, Case; third, Louis Disbrow, Case. Time, 5.29.

Australian pursuit race—Won by Louis Disbrow, Simplex; second, Joe Nikrent, Case; third, Neil Whalen, Case. Time not taken.

Five-mile free-for-all—Won by Louis Disbrow, Simplex; second, Joe Nikrent, Case; third, Neil Whalen, Case. Time, 5.25⅘.

Sunday, May 19.

One-mile class C—Won by Louis Disbrow, Simplex; second, Henry Ball, Apperson. Time, 5.16.

Five-mile class C—Won by Neil Whalen, "Little Giant"; second, Joe Nikrent, Case; third, P. Hough, Ford. Time, 5.40.

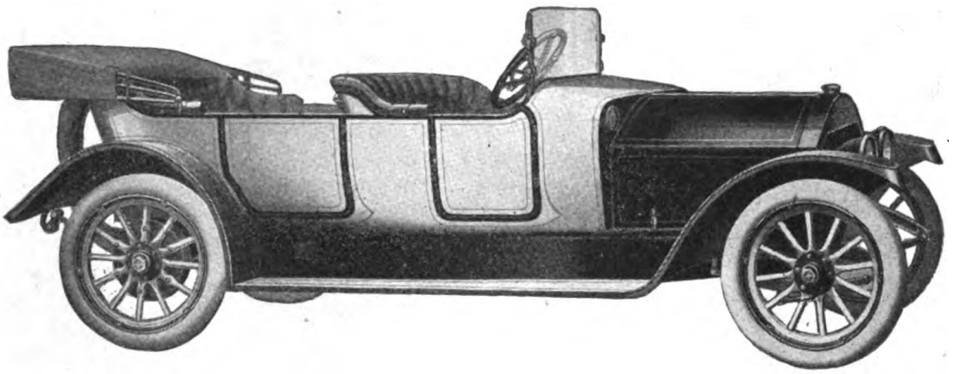
Free-for-all Handicap—Won by Neil Whalen, Case. Time, 5.40.

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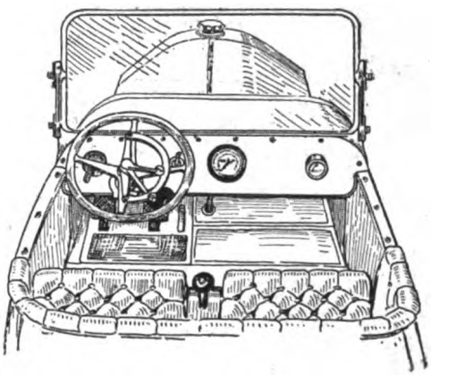
HENDERSON CAR MAKES ITS DEBUT

An Appealing Creation in Respect to Mechanical Features, Equipment and Prices—One Chassis Only.

Backed by an executive and selling organization whose experience has been gained in a long and successful exploitation of Cole cars, the first product of the newly formed Henderson Motor Car Co. has made its appearance, and if appearances go for aught, its success should be instant and lasting, for its designers have drawn heavily from their stock of knowledge of up-to-date practice and have produced a car in the moderate price class that incorporates improvements that place it in a plane considerably above that which might be suggested by the mere dollars and cents of its selling price.



FIVE-PASSENGER HENDERSON IN TOURING TRIM



DASH AND CONTROLS

The home of the new car is in Indianapolis, Ind., and, as already is well known, it will be produced under the management of such well-known men as L. Carter, who is president of the new company, and who was president of the Henderson Motor Sales Co. since its inception; and R. P. Henderson, who, with his brother, Charles S., made the Cole distributing company what it was, and whose previous experience as sales manager for the Parry Mfg. Co., gave added value to his position of vice-president and general manager to the new company. Charles K. Share, who up to recently was assistant secretary and treasurer of the Willys-Overland Co., is treasurer, and L. S. French is secretary and advertising manager, his former position in charge of all the Cole publicity that emanated from the Henderson Motor Sales Co. standing him in good stead with the new company. The actual production of the cars will be under the active supervision of Charles A. Trask, who for a time was chief engineer and factory manager for one of the plants of the General Motors Co. Trask is the factory manager of the new company, and Chester S. Ricker is the chief engineer.

Like several other well-known companies that market but a single chassis, the Henderson Motor Car Co. is following in the footsteps of those who believe that only in specialization and the centering of all attention and energy on one product is perfection attained. Hence, but a single chassis, conservatively rated as to power, is produced, and on it are mounted two body styles, one a roadster which, with unusually complete equipment, lists at $1,285, and the other a five-passenger car, which lists at $1,385. The bodies in each case are the straight-line creations that fashion and present-day practice demand, and their pleasing appearance has been enhanced by a deep cowl dash that serves the additional purpose of housing the gasolene tank in most approved foreign style. Both cars are particularly low hung, made possible by a "kicked up" frame and flattened springs, and thus present a rakish appearance that is increased by carefully fitted mudguards and well blended lines.

In deference to the already well-developed demand for such construction, the steering wheel is placed at the left side with a single control lever in the center. The position of the lever is unorthodox, however, in that it is placed between the front seats and thus is entirely out of the way of both passengers, who are free to enter or leave by either door, entrance and exit being facilitated by locating the spare tires in a rack at the back of the tonneau. Another unusual feature of the control lever, and one that is exclusive with the Henderson cars, is that the control is selective through a vertical H-quadrant. To obtain low speed the knob-topped lever is lifted about an inch and moved backward; second speed is obtained by simply pushing the lever forward, when it drops on assuming the neutral position, and moves still further forward an inch or so into the second speed position. To mesh third, or high, speed it is merely necessary to pull the lever straight back. Reverse gears are enmeshed by raising the lever in the neutral position and pushing it forward. There is no emergency brake hand lever, its place being taken by a ratchet stop pedal operated by the right foot. The brakes are twin expanding on the rear wheels, the service set being brought into operation by a further downward movement of the pedal that operates to disengage the clutch, which is of the cone type. Both sets of brakes are equalized and operate in 14-inch drums, adjustment for wear being facilitated by providing easily accessible turnbuckles.

With due regard for the greater flexibility and power of the long-stroke motor, the Henderson power plant has a stroke-bore ratio of 1.27, the bore and stroke being 4⅛ inches and 5¼ inches, respectively. All four cylinders are cast in a block, and by way of compensating for the gradually lowering quality of fuel, the intake manifold is cast integral, so that advantage may be taken of some of the heat of combustion in vaporizing the gases. Liberal water jacketing is provided, particularly about the valves and parts, which are located all on the right side and fully enclosed by a tight covering. The cooling medium is circulated by thermo-siphonic action. The valves are unusually large considering the size of the cylinders—2⅛ inches in diameter with 3/8 of an inch lift—and it is stated that by reason of the shape of the gas passages, the motor is enabled to develop in excess of 50 per cent. more than its rating. One of the reasons for the claim is that because of the location of the gasolene tank, which is comparatively high, a good "head" of fuel always is available, while at the same time the length of the intake pipe has been reduced to the minimum and "loading up" practically eliminated. The carburetter is a Schebler of the latest type, and for ignition a Remy magneto, in conjunction with a storage battery for starting, is used. Lubrication is effected by splash and force feed, the connecting rod big end bearings dipping into reservoirs that are maintained full from the overflow that is pumped to the three main engine bearings by means of a plunger pump operated by an eccentric on the cam shaft. The driving gears of the cam shaft are of the helical type, to insure quietness of operation.

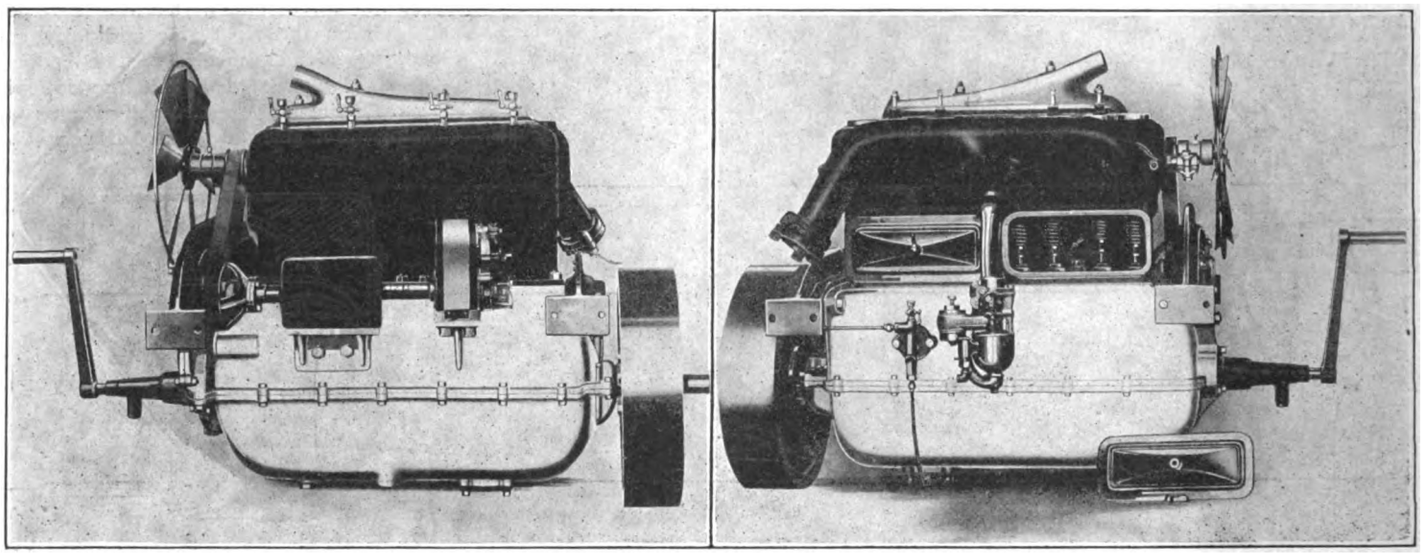
As part of the standard equipment, a Ward-Leonard electric lighting system regularly is supplied, and is built into place on a special bracket cast integral with the crankcase. It is driven by the same shaft that drives the magneto and is designed to

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carry the full lighting load when the car is driven at speeds greater than 10 miles an hour. For auxiliary lighting, when the car is idle, a storage battery is used, and automatically is maintained in a constantly charged condition by the generator. Also included in the standard equipment is a Disco engine starter.

The rear construction is of the well-known Stutz manufacture and, like the motor, is arranged for three point support, the change speed gears being mounted in a housing that forms a unit with the differential casing. The yoke at the forward end of the torsion tube is supported by a cross member of the frame through two large pins and is free to turn on the torsion tube itself, thus permitting a universal action. The change speed gears permit three speeds forward and reverse, as already mentioned, and the shafts are mounted in ball bearings. The driving axles are of the distinctive Stutz three-quarter floating type and rotate in liberal sized roller bearings. The chassis is mounted on the conventional semi-elliptic front and three-quarter elliptic rear springs.

As regards the finish of the cars, there is little left to be desired. With the owner's horror of tarnished brass in mind and his dislike for making use of "elbow grease," what bright work there is has been nickeled and seldom requires attention. The side lamps are set into the dash in most approved form and the head lamps are finished in nickel and black. Bodies are roomy, the width of the rear seat in the touring car being 47 inches, the doors are wide and the comfort of passengers has been catered to by tilting the seats and paying particular attention to the upholstery. The standard equipment that regularly is furnished includes: Ward Leonard electric lighting system, full complement of lamps, Disco engine starter, Prest-O-Lite tank, gasolene gauge on dash, demountable rims, tire repair kit, tools and horn.



TWO VIEWS OF HENDERSON BLOCK MOTOR, SHOWING VALVES AND LIGHTING GENERATOR

PERSUADING THE FARMERS TO BUY

"Too Busy" Excuse Met by Novel Methods in the West—Salesmen Accompanied by Farm Hands.

It is very evident that, to revert to the vernacular, the farmer is elected—elected to buy motor cars regardless of his piteous pleas that he is altogether too busy with his work to talk to salesmen. Heretofore when the motor car salesman approached a farmer who had not quite made up his mind to invest in a machine the agriculturalist would shake his head, mutter "Too busy!" and start off behind his plow.

That's a thing of the past, however; the farmer can't do it any more—at least, not when the salesmen of the United States Motor Co. are on his trail. The very latest idea of these progressive agents is to enlist the services of a number of able-bodied farm hands. When a salesman goes among farmers he takes one of these husky assistants along with him, and if the farmer falls back on the usual excuse, the affable salesman effectually checkmates him. "That's all right," he says. "Here's a man who'll engineer the plow and let you rest a bit while I tell you about the machine and give you a little spin. You can't lose anything!" And the farmer who won't give up to such persuasion must indeed be a hopeless case. As a matter of fact, the agents are of the opinion that only a very small proportion of such "prospects" are in the utterly "hopeless" class.

This new method was discovered during a western trip made by Horace DeLisser, vice-president, and Alfred Reeves, general sales manager, of the United States Motor Co., who firmly believe that a very large number of cars can be sold to farmers during the next four months, and they propose to do at least their share of the business. A good start has been made—with the aid of the new "heavy brigade."

Flying Rim Suit Settled for $2,000.

As the case of James B. Stiles against the Lozier Motor Co. approached trial this week in the Supreme Court for New York County, Stiles asking damage for personal injury sustained in a peculiar accident two years ago, the case was settled out of court for $2,000, of which $650 was paid by the Lozier company and the remainder by Robert Kamber, a chauffeur, and others. The accident was of such a nature as to stand in a class by itself. Stiles was walking down Broadway at West 56th street, June 29, 1910, as Kamber, who owned the car, was blowing up a tire in front of the Lozier branch on the opposite side of the street, using the Lozier company's pump. Suddenly the tire blew up and the rim sailed up in the air and Stiles was painfully injured when that part of the vehicle came down upon him. He spent some time under the care of a physician, being for three weeks in a hospital. There was no denying the circumstances, and rather than go to further trouble and risk a verdict with a jury, the amicable settlement was made.

Yakima Adopts Red Apple for Radiators.

If a big dust-covered touring car rolls into town some day and you happen to spy a nice big red apple on the radiator cap, which may look as if it were there to roast, don't try to pick it off. If you do you are likely to be the victim of a laugh and if you peer more closely through the dust you will see "Yakima" in white enamel letters on the apple. The tourist displaying this novelty will be a member of the Yakima Automobile Club of North Yakima, Wash., and is out to advertise that apple country with western vim and originality. The club recently decided to make the red apple the official emblem of their club, to be worn on the radiator.

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ANATOMY AND FUNCTIONS OF UNIVERSAL JOINTS

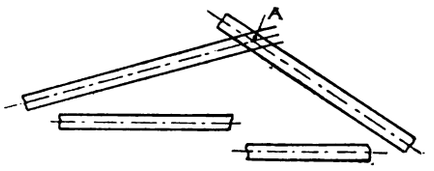
Theory That Governs the Application of Flexible Couplings of the Several Types and the Conditions Under Which They May or May Not Be Used—Salient Features of the Variety of Joints in Common Use Made Plain.

Contrary to the not uncommon conception of the function of the plain universal joint, the device is not intended to be used indiscriminately in connecting any two rotating shafts that may be out of line. There is a well-defined distinction which must be borne in mind, though it is one that few persons appreciate despite its apparent obviousness. It is more or less well known that at least one universal joint of some form or other must be used in every automobile though possibly because it seldom if ever gives trouble or otherwise makes its presence felt it rarely is given even a passing thought. Nevertheless the device in itself is a more interesting piece of mechanism than generally may be supposed is the case and there are more variations of it than are known to not a few fairly well-informed persons.

In the simplest possible language, the purpose of the universal joint is to transmit power around a corner, so to speak, while at the same time permitting angular movement between the two shafts that are connected. If no angular movement is necessary, the universal joint can be dispensed with and its place taken to very much greater advantage by ordinary bevel gears. Obviously, however, where the angularity of two shafts which must be connected constantly is changing within comparatively wide limits the use of gears is out of the question and some other means of transmitting the power from one shaft to the other must be sought. For this purpose, the universal joint is the only practical mechanism which can be used.

The distinction which has been referred to as affecting the application of the universal joint is that the shafts which are connected must intersect at the theoretical center point of the joint. That is to say, supposing the joint to be removed and the shafts elongated until they meet, the theoretical point at which their centers intersect will be the theoretical center of the universal joint. Or, in other words, the angle formed by the two shafts may be any degree, within certain limits, or it may change constantly, but it is absolutely essential that the center lines of the two shafts intersect at the center line of the joint. The theory is illustrated in the accompanying figure, the point A representing the intersection of the center lines of two shafts and the theoretical center of the universal joint.

It is not possible to use a universal joint as ordinarily constructed in any other position than at the point illustrated. When the two shafts lie parallel to each other, as in the lower figure in the illustration, it is not possible to employ a universal joint to connect them for the reason that their center lines can never intersect. It then becomes necessary either to use two universal joints, with a short "floating" shaft between them or to employ a device similar in operation to an Oldham coupling. The Oldham coupling itself seldom if ever is used at present though at one time a good many years ago it was used to a considerable extent. It is a notorious absorber of power, however, and other and better devices which operate with greater economy long since have taken its place in the majority of cases though it still is employed to advantage by a few manufacturers for comparatively minor purposes such as driving



UNIVERSAL JOINT THEORY

magnetoes and water pumps. In such a position the strain can be but little and as it transmits a very small amount of power between shafts that for the greater part of the time might as well be solidly connected the power loss and the wear in the device itself is negligible.

The difference between the Oldham coupling and the universal joint is that the former is designed to transmit power between two rotating shafts that are parallel or that have only a very slight angularity whether the centers intersect or not. That is to say, it may be used in some cases where the use of a universal joint is impossible. Because of its construction, however, which is shown by the accompanying illustration, the shafts can be very little out of line if they are parallel or excessive wear takes place. Referring to the picture, the Oldham coupling, or Hooke's joint, as it sometimes is called, consists of three parts, namely, two flanged plates and a center member. The flanged plates are slotted, as shown, and the center member is formed with two projecting lugs, one on either side and at right angles to each other. The projecting lugs fit into the face-plates, the drawing showing them separated in order to make the construction clear. It may be seen that the angularity of the shafts which are connected by means of an Oldham coupling is governed by the fit of the lugs in the slots and the space between the several members. In any case it cannot exceed a few degrees.

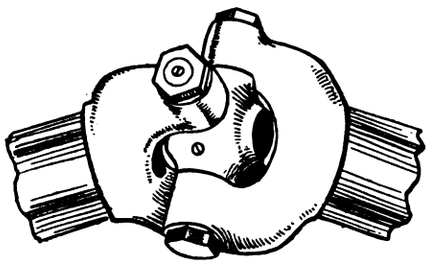
The universal joint, on the other hand, is designed to transmit power from one rotating shaft to another provided the centers of the shafts intersect at the joint and regardless of any angularity up to approximately 45 degrees. Universal joints have been made and used to operate at angles of greater than 45 degrees, though the power consumption in such cases is considerable. Generally, the angularity of the shafts does not exceed 30 degrees where the best results are to be obtained and in the majority of cases joints are arranged so that the angularity is nearer to 20 degrees. Needless to say, the use of Oldham couplings where such great angularity of the shaft obtains is impossible.

Though the functions of the Oldham coupling and the universal joint thus are distinct there have been several flexible connections developed which partake of the functions of both. Among the more noteworthy of these is the new universal which has been adopted for the lower powered De Dion cars. As may be seen by the accompanying illustration, it is essentially a box-like structure and the construction is such that it has the further advantage of being a slip-joint. Two grooved members which serve as terminals for the shafts are carried in other members which bear on the upper and lower sides of the housing. Consequently, the shafts may approach each other a short distance to compensate for the shortening of the propeller shaft as the driving wheels pass over an obstruction while at the same time the shafts are permitted to move sufficiently in any plane, irrespective of each other, to preserve the bearing of either from damage. Not the least of its noteworthy features is that by reason of the employment of the minimum number of parts wear can be taken up easily and at little expense by replacing the sliding members that serve as bearings for the squared shaft ends.

The standard universal joint, as ordinarily constructed, consists of three parts, as shown in the accompanying illustration of the bronze joint which is one of the many products of the Boston Gear Works. In the simplest aspect, the shaft end portions are merely yokes and are exactly alike. The center portion is a short shaft having at its center, and at right angles to the

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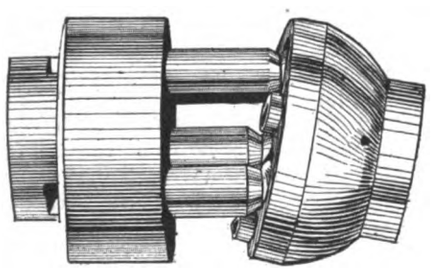
shaft proper, two protruding portions which engage the arms of one of the yokes. The arms of the other yoke fit over the other ends of the center portion. As has been previously stated, the yokes and center portion of this particular joint are made of hard bronze. The studs are formed of nickel steel and are securely fastened into the center, thus bringing the driving strain on the strongest part of the joint. The construction of the joint and the method of fastening the studs into the center portion is illustrated in the cross sectional view which also shows the oil passages and the careful provision for ensuring thorough



BOSTON BRONZE JOINT

lubrication. As regularly supplied, the joints are designed to operate at an angle of not more than 25 degrees.

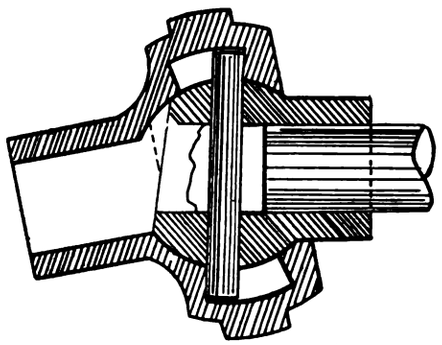
By reason of the location of the universal joints in an automobile, which generally is on the propeller shaft where they are exposed to road dust and accumulations of abrasive material thrown up by the wheels, it is essential that they be thoroughly protected. Generally, a leather boot is used for the purpose and it also serves to retain the lubricant which in the majority of cases is grease of medium consistency. Too much stress cannot be laid upon the necessity for constant and thorough lubrication for under ordinary conditions the parts of



TADINI CONSTRUCTION

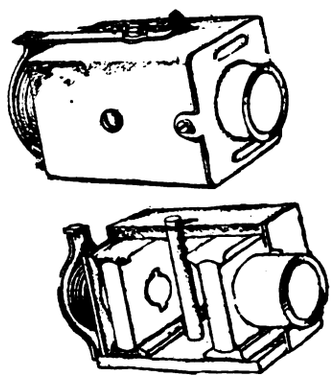
a universal joint are in motion every instant the car is moving. Obviously, the less the angularity between the connected shafts, the less will be the wear and the power absorbed and this has led a great many car manufacturers to seek a straight-line drive. But while it is possible to obtain a straight-line drive under certain favorable conditions, as when the car carries a certain load and is driven over perfectly smooth roads, for instance, lighter loads or a rough road bring the universal joint constantly into use. Hence it is absolutely essential that great care be taken to see that lubrication is thorough or wear soon will cause a decided thump which may be difficult to trace.

With the necessity for constant lubrication and protection from the ingress of road dirt in view, the Spicer Mfg. Co., Plainfield,



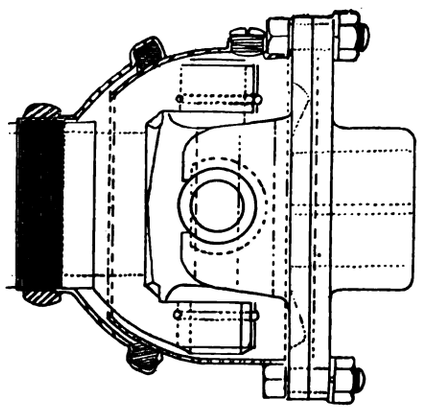
WALTERS FLEXIBLE COUPLING

N. J., has developed a type of universal joint in which the casing forms in effect an integral portion of the joint. As may be seen by the accompanying illustration, the casing is formed in two parts, one of



DE DION BIFUNCTIONAL JOINT

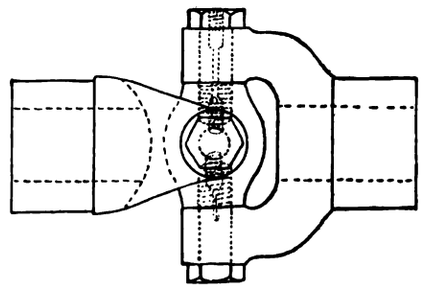
which is mounted on each half of the joint. These parts are hemispherical in form and telescope one into the other. Where the outer portion comes in contact with the other a recess is formed and holds a thick



SPICER COVERED JOINT

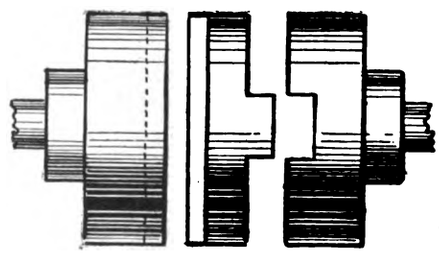
felt washer that is saturated with grease. Consequently it forms a seal which effectually retains the lubricant surrounding the working parts and also prevents road dirt, or water, from entering. The joints are made in a variety of styles and sizes and the construction of the essential portions differs but little from the standard universal joint that has been described.

When the driving wheels of an automobile meet and pass over an obstruction in the roadway or drop into a slight hollow, the action of the springs permits the rear axle to alter its relationship to the chassis frame. If the radius on which the wheels swing is the same length as the length of the propeller shaft between universal joint centers all is well and good. But if the radius on which they swing is less than



"BOSTON" JOINT IN SECTION

the length of the propeller shaft there is required some sort of a flexible connection to allow of the slight lengthening or shortening of the distance between the axle and the motor that takes place. The device which permits of this movement is styled a slip joint. In the new universal joint that but recently has been adopted by the manufacturer of Regal cars the slip joint is incorporated in the universal in a manner that scarcely could be improved upon for simplicity and for positiveness of action. Referring to the accompanying illustration, the rear end of the propeller shaft carries a bronze trunnion block that fits into a square slotted member carried by the differ-



OLDHAM COUPLING

ential shaft. As two sides of the trunnion block are slightly spherical, angular movement of the shaft in its plane is permitted while at the same time the block may move slightly backward and forward to compensate for the constantly varying differences in distance between the motor and the driving axle. Movement of the shaft in the plane at right angles is permitted by the trunnion pin which passes through the block and the rear end of the shaft.

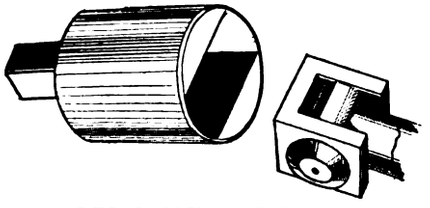
As ordinarily constructed, universal joints are not intended to sustain end thrust loads. The very nature of their construction makes plain the fact. Occasionally, however, exigencies arise that make necessary the

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employment of a mechanism that will sustain thrust loads in addition to operating as a universal joint and to supply such demand the Mechanical Devices Co., Watervliet, N. Y., manufacture a unique type of joint that is styled the Walters ball-bearing flexible shaft coupling. The construction of the device is shown by the accompanying cross sectional drawing from which the reason for the appellation "ball-bearing" may be judged. Like other orthodox universal joints, the Walters coupling consists of but three essential parts though their arrangement and form is quite different from that which usually obtains. The two end portions are spherical in form and fit into each other and thus sustain a thrust load if necessary. The center pin is formed of steel and bears on bronze shoes which are so fastened that their removal requires but a few minutes. One of the excellent features of the joint is that the ball is not seated in contact with the entire surface of the socket but only with a narrow ring in it. Consequently, friction is reduced to the minimum and the wearing qualities of the joint improved materially.

The Gray & Prior Machine Co., Hartford, Conn., manufactures another type of universal joint and it is designed to sustain both end thrust and tension loads. It is quite different in design, however, and as may be seen in the picture which is reproduced approximates more closely orthodox universal joint construction. One of the interesting features of the device is that the manufacturers have purposely limited the angle at which it may be operated to 45 degrees, the method by which the limitation is obtained being plainly apparent in the picture. The outer sleeves are rather longer than is usual and are beveled at their edges. As the angle formed by the ends of the joint is increased the sleeves come together until they eventually touch, at which point the angularity is equivalent to 45 degrees and cannot be exceeded. Though the joints will run quite well at this angle it is recommended that between 20 and 30 degrees will be productive of the best all around results. One of the noticeable features of the joint is that small parts, even to nuts and screws have been eliminated and the parts that are likely to come into contact are carefully rounded so that accidental cutting is practically impossible. The drive is transmitted through a large squared center block and the bearing surfaces, which are unusually large, are case hardened.

In all universal joints of orthodox construction there are certain positions of the parts that give rise to what have been styled "dead points," or in other words, dead centers. It is because of these "dead points" in a measure, that the wear in the joints is increased for the drive is only intermittantly transmitted and though the instantaneous cessation of driving effort may be impossible of detection in the operation of a piece of machinery, it exists nevertheless. In seeking to eliminate such "dead points," the Tadini Auto Co., New York City, has developed a type of universal joint that is entirely different from anything else of its kind. The joint is shown herewith in assembled form, but with the dust-tight cover removed in order that its construction may be seen. The cover slides over both ends of the joint and in addition to excluding dust and dirt retains the lubricant. The essential features of the joint are two plates made of steel and three driving pins. One of the heads is drilled clear through and the other has formed in its face three hemi-



REGAL SLIP UNIVERSAL

spherical indentations. The driving pins are cylindrical for the greater part of their length and at one extremity are formed ball heads which fit into the hemispherical indentations in one of the driving heads. They are held in place by a retainer which is screwed to the face of the driving head. The other ends of the three driving pins fit into the drilled holes in the other driving head and are free to slip in and out according to the angularity of the shafts between which the joint is placed. Among the



GRAY & PRIOR DESIGN

claims which are made for the unusual construction is that vibration is materially decreased and that the friction is considerably less than it is with any other form of universal joint.

Ratchet Wrenches Brought up to Date.

Ratchet wrenches with interchangeable heads for nuts of various sizes, for motor car use, at first were mere adaptations of the heavy, clumsy tools used in machine shops, and only their real utility kept them in the tool-boxes of the motor cars. The ratchet wrench of today, however, is a vastly improved tool, light and compact, strong and convenient. But it still is being improved and the latest ideas being embodied in the Ray outfit, manufactured by the Packer Auto Specialty Co., of Old Colony Building, Chicago, a newly incorporated Illinois concern, for which the Fulton-Grubb Co., of 1146 South Michigan avenue, Chicago, is the exclusive distributor.

The Ray socket wrench is made up in two outfits, differing only in the number of socket heads included in the sets. The small set consists of the roller ratchet handle, two screw-driver blades which fit into a special socket, one long and two short extension bars, a universal joint, 12 socket heads and a special long spark plug socket, which permits the easy removal of spark plugs without danger of cracking the porcelains. The universal joint permits the operation of the handle at an angle of 90 degrees to the bolt, while the long extension bar, used with the ratchet handle, permits working in the crankcase and other inaccessible places. The large set is similar to the small set except that it includes 33 sockets instead of 12, and is packed in a wood case, whereas the small set is in a leather case.

The ratchet mechanism is of the roller type—a principle that has been in use for many years and is of known reliability. One of its great advantages is that it can be effectively operated with an extremely short stroke, when properly constructed. The Ray ratchet is reversible, pressure on a knurled collar on the shank changing the direction of the effective movement. The sockets are of pressed steel, case-hardened, and the handle is nickel-plated and of course highly polished.

Hardening That Affects Tool Steel.

Tool steel, especially of the better sorts, is seriously affected by overheating; hardening always should be done at the lowest possible temperature, therefore, in order to bring out the best that is in the metal. Before hardening a piece of tool steel that is of value for any reason, or which is required to work up to its full capacity, it is a good plan to cut off a few small pieces from the blank end and heat and harden them experimentally, so as to ascertain the lowest temperature at which they will harden satisfactorily.

Copper Tubing and the Bending Thereof.

Copper tubing that is to be bent should be soft or annealed; otherwise it is apt to crack when too sharply bent and to flatten at the curves. Tubing that is too hard may be softened by the simple expedient of heating it to a dull red and allowing it to cool. This may be done by passing the tubing slowly through the flame of a gasolene torch, or even through the flame or an ordinary gas stove, if the tubing is of small size. Excessive heat is injurious to the metal; a rather dull red is sufficient.

One Advantage of Gasolene-Electric.

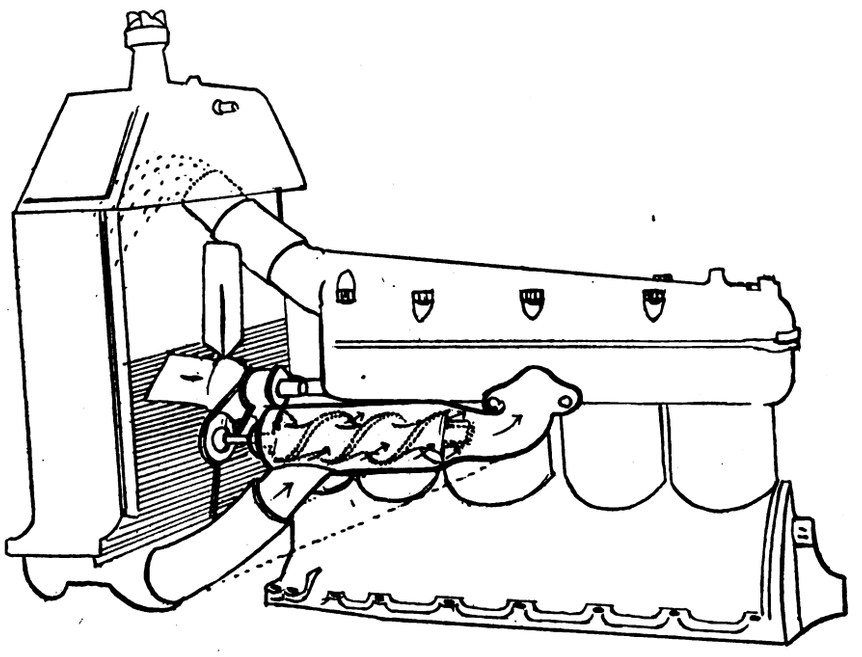
One of the advantages of a motor car of the gasolene-electric type, and one of which advantage might be taken more often than it is, is that the machine contains within itself a motor starter, ready for use by the mere application of a suitable current of electricity. The generator can be run as a motor by the simple expedient of supplyng it with current, and the only additional apparatus required would be a storage battery, if the car should happen to be without one.

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TO ASSIST THERMO-SIPHON SYSTEM

"Water Circulator" Designed to Serve That Purpose—How it is Applied and How it Operates.

There can be no doubt of the efficacy of the thermo-siphon system in maintaining the cooling water of an engine at the proper temperature under all ordinary conditions for the simple reason that the rate of flow of the water is governed directly by the heat that is generated. That is to say, the hotter the engine becomes, within certain limits, the faster the water circulates and absorbs the heat. Still, there may be occasions, as when a car is being driven up a steep hill with the spark retarded, for instance, when the temperature of the water rises too abruptly to permit of efficient cooling and it is to forestall the troubles that may arise under such circumstances that the T-H circulator has been developed by men who have had experience.



APPLICATION OF T-H WATER CIRCULATOR

The device is the product of the Thorndike-Hutton Co., Sioux City, Ia., but is to be marketed by the Fulton-Grubb Co., Chicago, Ill., which company recently contracted for the entire output and will control the distribution. As the designation of the device implies, it is designed to circulate the cooling water, or rather to assist thermo-siphonic action in maintaining constant and positive circulation. In attaching the T-H circulator to a motor, the inherent simplicity of the thermo-siphon system of cooling is not sacrificed to any noticeable extent for the reason that the device is the incarnation of simplicity itself and consists of but two parts, only one of which ever is in motion.

As may be seen by the accompanying illustration the apparatus consists of a cast aluminum manifold which is intended to replace the ordinary water inlet pipes. Inside the manifold an endless worm screw is mounted, a bearing at either end serving to hold it in place. The screw is rotated by means of a belt and pulley, the belt passing over the fan pulley or any other convenient rotating shaft, such as the magneto shaft, for instance. In operation, the water is fed into the lower part of the circulator from the bottom of the radiator whence it is forced into the engine jackets and returns to the radiator. By reason of the fact that the worm screw fits quite loosely in the casting, its stoppage for any cause would not seriously impair the efficiency of the cooling system for the water would continue to circulate around it. As the device is constructed at present its application is restricted to Ford engines, though the plans of the manufacturer include the ultimate production of the device for all engines that are cooled by the thermo-siphon system.

Reo to Enlarge Plant at Lansing.

To increase its output of 1,100 cars per month, the Reo Motor Car Co. has placed contracts for a considerable enlargement of its plant in Lansing, Mich. One new three-story building, 500 x 80 feet, will be erected and an extension, 500 x 54 feet, will be added to one of the present already large structures.

Vulcan Steel Doubles Its Capacity.

The Vulcan Crucible Steel Co., of Aliquippa, Pa., has completed and taken possession of a 350-foot extension of its former mill building, which gives it two complete mills. The company makes a specialty of high grade alloy steel for the automobile trade.

CARE NEEDED WITH MODERN STEELS

Old Methods With Newest Metals May Mean Ruin—What May and May Not Be Done.

Coincident with the development that everywhere is evident, the improvements that have been made in methods and machines and particularly in tools used in the working of the better grades of steels, such as are employed in making parts that are subjected to great strain, make necessary occasional readjustments which if neglected well may work havoc with production efficiency. For instance, the old methods which were used in forming, grinding and hardening lathe and planer tools no longer are applicable, as the development of tool steels has kept stride with other developments and the present-day high-speed steels require treatment that is entirely different from that which was given the comparatively soft metals that were used even a year ago.

If satisfactory results are to be expected from the use of high-speed tool steel it is essential that the utmost care be taken in the several operations necessary in completing the tool. In cutting a length from a bar, the steel should be cut clear through with a hack saw or else heated to a dull red and cut off with a sharp cold chisel Nicking the bar and breaking off the length—a method that may be employed with impunity unless high-speed steel is used—should not be resorted to as there is danger of straining the metal in such a way that some of its valuable properties will be lost. In forging, the same care should be taken and the bar shauld be heated slowly to a yellow heat, but not further back than is necessary to form the tool. The bar should not be worked at less than a bright red heat and if necessary should be replaced in the fire and re-heated as often as is necessary. Under no circumstances should the metal be hammered cold. After the tool is dressed it should be re-heated to forging heat and permitted to cool slowly to remove the forging strains. The tool then is ready to be rough ground.

Hardening is the next operation and never should be attempted at forging heat. The end of the tool should be heated slowly to a cherry red first and the cutting edge then brought as quickly as possible to a white "sweating" heat and immediately plunged into cold oil. As the quicker the tool is cooled the better will be the results it is a good plan to keep it moving rapidly in the oil until it is quite cold. When the tool is ground to a final cutting edge either a dry or a wet stone may be used. If a dry stone is used it should not be permitted to "gum" and if a wet stone is used sufficient water should run to prevent checking. Lathe and planer tools at first should be ground very heavily but not too forcibly.

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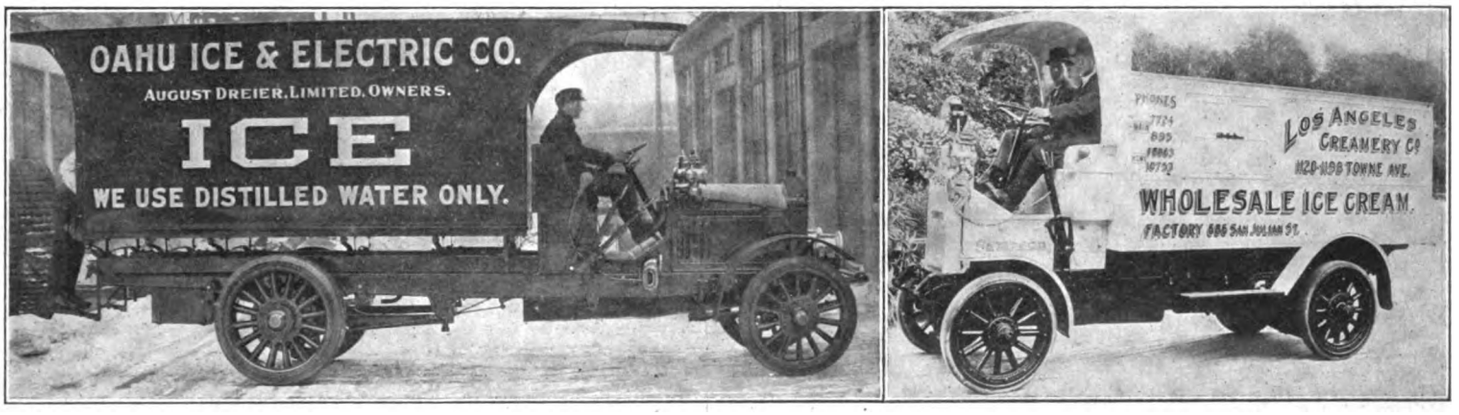
FOR COLD WORK IN WARM CLIMATES

Two Trucks Specially Designed for Ice and Ice Cream Trade — Unusual Features Which They Incorporate.

There is something in the mere thought of ice and ice-cream in semi-tropical climates that irresistably brings to mind the old simile in which reference is made to the durability of a snow-ball in a climate usually deemed to be super-tropical. The association of such ideas is not wholly fantastic, either, for where such extremes as ice and a hot climate meet the balance of power is so overwhelmingly in favor of the upper end of the thermometer tube that the preservation of things associated with the opposite end of the instrument is a matter of no little difficulty. If loss through melting is to be kept within anything like reasonable bounds the elapsed time between production and consumption must be kept down to the minimum, and the juxtaposition of antipodean conditions must be prevented as far as possible. All of which has to do with the two motor trucks shown in the accompanying ilustrations, which serve the dual purpose of shortening the time during which the cold things they carry must be exposed to the heat, and of keeping the torridity out and the frigidity in as far as is possible under the circumstances.

Hauling ice in Honolulu is the mission of the big machine on the left—a worm-driven five-ton truck built by the Pierce-Arrow Motor Car Co., of Buffalo, and owned by the Oahu Ice and Electric Co., of Honolulu. The body, which was designed at the Pierce-Arrow factory, is built with an eye single to the transportation of ice. The entire floor and the sides to a height of two feet are coverd with heavy zinc plate, forming a pan which catches water and is drained at the front end. Gratings of wood protect the soft zinc from damage from the heavy ice blocks, of which the truck carries 36 of standard size. The roof is extended forward to form a cover over the seat and rearward to protect the men while handling and weighing the ice—and, incidentally, to keep the sun off the ice. As considerable night work is done, a lamp is fitted at the rear.

The truck shown in the illustration on the right is a Sampson combination ice and ice-cream truck of two tons capacity, built by the Sampson division of the United States Motor Co.; it has a special refrigerator type body that possesses several unusual features and is owned and operated by the Los Angeles Creamery Co., of Los Angeles, California, which does a heavy wholesale ice-cream business. The interior of the body is divided into three compartments. In the rear section cracked ice is carried; there is space for a ton and a half of ice, which is loeded and unloaded through rear doors. In the front compartment ice-cream to the amount of seventy gallons is stowed, while between the two is a space for empty ice-cream tubs; the front and middle compartments are reached through side doors. The body is strongly constructed of ash and three-ply veneer, with an interior sheathing of galvanized iron and an insulating layer of cork between the wood and the iron. The combination of wood, cork and iron is said to be decidedly effective in staving off the dissolution of the cold things within.



PIERCE-ARROW ICE TRUCK AND SAMPSON ICE CREAM WAGON THAT EMBODY NOVEL IDEAS

Chase Adds Two-Cylinder Truck.

The Chase Motor Truck Co., Syracuse, N. Y., whose vehicles are distinctive by reason of the employment of three-cylinder, two-cycle air-cooled motors, has increased its already extensive line by the addition of a new model which is rated at 500 pounds capacity. With open express body the new vehicle lists at $500 and instead of the three-cylinder motor that characterizes the other cars of the line is equipped with a two-cylinder power plant. Like the others, however, it is air-cooled and is of the two-cycle type. The bore and stroke of the new motor are the same as obtains in the case of the motors used in the 20 horsepower vehicles, namely 4⅛ and 4 inches, respectively, and the rating is 12 horsepower. Ignition is effected by Bosch magneto with fixed spark and the change speed mechanism is of the planetary type.

TRUCK OWNERS GET GOOD ADVICE

Alco Builders Offer Summarized Suggestions—Because Truck is Inanimate No Excuse for Maltreatment.

To a certain extent the regulation of the loads placed on horse-drawn trucks may be said to be automatic, for the horses will be stalled, so to speak, in bad places if the load is of excessive weight, and constant overloading will quickly show itself in the physical condition of the animals, even if they are not unable to move the loads to which they are harnessed.

The motor truck, on the other hand, is capable of hauling far more than its rated capacity, and the fact that overwork of this character does not immediately cause serious trouble not only leads many truck operators to overload their machines habitually, but also leads dealers, in some cases, to claim that their cars will carry overloads as a regular practice. More conservative motor truck concerns, however, prefer to restrict their machines to normal loads with a view to securing long life and uninterrupted service, and to this end are endeavoring to arouse in truck owners and drivers an appreciation of the importance not only of refraining from overloading, but of properly placing loads to the end that no part will carry more than its normal proportion of weight.

The American Locomotive Co., builder of the Alco trucks, takes an unequivocal stand on the matter of overloading and the unequal distribution of weight, and incorporates in its new truck instruction book a number of suggestions that apply to trucks in general and might, if followed out, cut down the operating expense of many a truck that is a cause of worry and dissatisfaction. Among the suggestions are the following:

"Balancing the load is a big factor in the successful operation of a motor truck.

"Do not place all the heavy articles on the rear of the truck. If you place a heavy article on the rear of the truck, put an

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article of like weight on the front end also.

"Do not place the load on one side of the truck. If the load is small, center it.

"If you have a small and heavy load, such as steel rails, use a small body. Have the body constructed so that the load will be centered.

"There was one case of a large dealer in structural steel supplies who used a platform body which extended over the wheels. The truck pulled up to the loading platform sidewise. The shipping department employes, as a matter of convenience, pushed all the load of steel on one side. Of course, the springs on this side were weakened. The tires also showed abnormal wear on that side.

"If a tank body is used to haul over rough roads, it should be made only large enough to carry a normal load.

"Some drivers are unnecessarily hard on tires. The way the truck is loaded has a good deal to do with the wear. Balancing the load not only saves the tires and springs but the driving mechanism also.

"Don't overload the truck. If the body is too big, don't load to the capacity of the body.

"When a horse is overloaded, he will not start. The load has to be taken off until he is able to proceed.

"When the power is applied in a motor truck, the truck will move, no matter what the load may weigh. It will do this even if greatly overloaded.

"But at the end of the season, when the truck is overhauled, poor judgment in loading tells. There will probably be many parts to replace that should not have been replaced for many seasons."

Berlin Rules on Taxicabs and Steering.

Berlin, which as every one knows is in Germany, is blessed or cursed (according to the temperament of the individual and his method of locomotion) with a Commissioner of Police whose propensity for issuing obnoxious regulations is unexcelled, if faith is to be placed on the reports that emanate from foreign sources. Lately he issued three regulations all at once and none of them has been hailed with delight. In the first he attacks "objectionable exhausts"; in the second he has laid his veto on steering mechanisms being shifted to the right side; and in the third he announces that he no longer will grant new licenses for taxicabs equipped with engines of more than 10 horsepower based on the revenue formula which is 0.3 X number of cylinders X square of bore in centimeters X the stroke in meters.

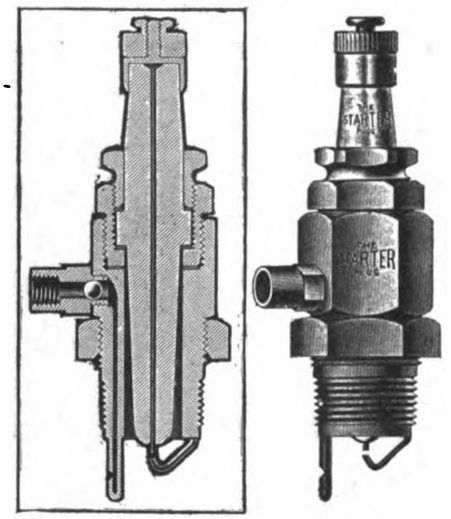
Tire Chains as Emergency Tow-Rope.

In case it is necessary to tow a car and there is no tow-rope or its equivalent at hand, a tire chain, or two tire chains fastened together end to end, may be used for the purpose with entirely satisfactory results. If the chain is light, care should be taken to have the strain come equally on both the side members.

SPARK PLUG FOR ENGINE STARTERS

Disco Ingenuity Finds a Clever Answer for a Pressing Demand—Plug Serves a Double Purpose.

The installation of a motor starter of the acetylene gas type is by no means a difficult matter where the tubing of the starter can be connected to fittings which screw into the places provided for the pet-cocks. Where there are no pet-cocks, however, and no provision has beer made for their use, as is the case with the motors of not a few cars now built, particularly of the smaller types, the task becomes more difficult because of the necessity for providing a means of ingress for the gas. Drilling through the water jacket and the cylinder



DISCO STARTER PLUG

wall and fitting a plug that will not leak under pressure and heat is a job that is not usually relished, but has in many cases been the only alternative.

The proverbial maternal parent of invention, however, has come to the rescue, and in unexpected fashion. Under the descriptive appellation of "starter plug" the Ignition Starter Co., of Detroit, has developed and just placed on the market a spark plug which includes, in addition to the parts necessary to its ignition function, a means for attaching the acetylene gas tubing, a passage for conveying the gas into the combustion chamber, a nozzle which directs the gas away from the sparking points and a ball check valve to prevent blowing back from the cylinder. Though the Ignition Starter Co. claims to have basic patents on this plug, and is itself the manufacturer of the Disco starter, it has adopted the broad-minded policy of supplying the plug to other manufacturers of crank eliminators at wholesale prices, expressing the belief that so doing will tend to increase the starter business generally.

As the accompanying illustrations indicate, the construction of the plug is simple and at the same time effective. The plug really consists of two units; the outer shell, which screws into the cylinder head and carries the pipe connector, check valve and gas passage, and the inner shell which holds the porcelain core and is screwed into the outer shell just as an ordinary plug is screwed into the cylinder. The inner shell has the usual packing nut and gaskets for making a tight joint with the insulating core, and when screwed into place comes down on a gasket which prevents gas leakage at this point. By virtue of this arrangement it is not necessary to remove the whole plug to examine or clear the sparking points; the outer shell remains in the cylinder as a fixture, as is necessary to avoid disturbing the tubing joints every time a spark plug is examined, and the inner shell carrying the insulation is removed in the same way as an ordinary plug.

A special feature of the plug is the little nozzle through which the acetylene gas is injected into the cylinder. It will be observed that the opening is made so that the gas flows away from the sparking points, so that when the spark passes the mixture will not be too rich to ignite, as would probably be the case if the gas flowed directly over the points.

Phonograph Ideas for Automobile Horns.

It often has been asserted that the sound produced by a motor car warning signal should be of an unusual character, so that it may be distinctly heard and heeded even among a variety of other noises. While it hardly can be said that the sound of a man's voice is anything unusual under ordinary circumstances, it assuredly would seem unusual proceeding from the brazen throat of a motor car horn. This, at least, appears to be the idea of an English concern which has been endeavoring to harness the human voice divine to a signalling apparatus to the end that when a crank is turned or a button pressed the device will emit yells of "Hi! Hi!" with the intent to galvanize into rapid motion persons who linger in the roadway. The concern which is fathering this novel application of the phonograph principle states that though it has hope of future success, it has not yet succeeded in getting the machine to roar with sufficient vigor to be heard in the noise of traffic. It may be a good idea, however, to add somewhat to the repertory of this machine, when its voice has been cultivated and strengthened, in order to be in a position to meet all contingencies. There should be say four buttons. Button No. 1 for feeble persons and attractive young ladies would cause the thing to say politely, "No hurry; take your time." Button No. 2, for the average pedestrian, "Step lively, please!" Button No. 3 for high speed work, "Car coming!" And for emergency service, Button No. 4, "Beat it, y' bum!" This would be much better than going through city and country, yelling "Hi! Hi!" indiscriminately at everyone.

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BOLT PHRASEOLOGY NOT MYSTERY

Terms of Threads, Sizes and Forms, Simple but Little Understood—Uses of Various Types.

"I don't know what you call it, but I'd know it if I saw it." Every hardware store clerk is painfully familiar with this phrase and also with the accompanying process of dragging out box after box of things that must be put back again, until finally the customer sees something that he guesses "ought to be about right." While this sort of thing comes hardest on the store people, it also is inconvenient for the purchaser if he is in a hurry, and very often it is the cause of one or more return trips to the store to make more guesses before exactly the right things are found. Bolts, for instance, are of so many different kinds that the mere asking for a bolt of a given size means little. Almost every trade has its own types of bolts, and these are subdivided into different sizes, threads, head shapes, finishes and so on.

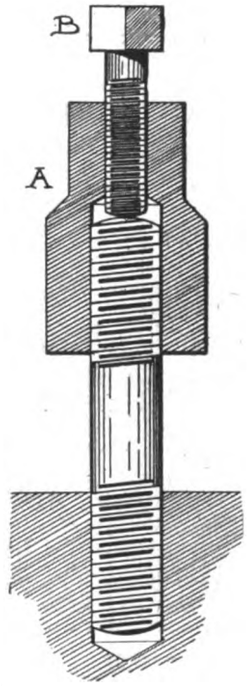
It is by no means difficult to become familiar with the common varieties of bolts and screws used in motor car work, but it is a fact that very many of those who sell and otherwise have to do with cars lack such knowledge. Except in a vague way they are not even aware that a machine bolt, as its term indicates, is intended to hold together machine parts, and therefore is of stock proportions. Roughly, the head is almost as thick as the shank, as it is expected to stand all the tensile strain that can be put on the shank. Machine bolts are made with either square or hexagon heads and are "black" or "finished"—that is, comparatively rough, just as they come from the dies, or machined all over. Threads are not cut very far down the shank because, where the greatest strength is required, bolt lengths are so figured that when the nut is tightened down it will be as near as possible to the termination of the threaded part. A bolt subjected to a heavy tensile stress will show weakness first in the thread, there being less material there to resist the strain. Therefore the less of the threaded part there is between the nut and the head, the better.

Machine bolts used in holding together parts that must be held absolutely without movement and very accurately positioned usually are "finished" and are fitted into holes that are carefully reamed so that the bolts must be lightly driven home. These are known as "fitted" bolts.

Machine bolt nuts, like the heads, are either square or round and of the same finish as the bolts themselves. Where split-pins are to be used to prevent the nuts from backing off it is not uncommon to use "castle" or "castlelated" nuts—that is, nuts that are slotted diametrically so as to provide recesses for the split pins, there being six slots to a hexagon nut, and consequently six different positions for the split pin. The thread of a machine bolt is deep and strong and the nut is a close fit with very little or no shake when on the thread.

A cap-screw is like a machine bolt in that it is intended to hold together machine parts, and so is of heavy design; it differs, however, in that it is used without a nut, being screwed into a tapped hole. The head therefore is made somewhat longer than the head of a bolt, so as to give a good bearing for the wrench. Usually cap screws are finished all over.

A stud has no head at all, but is threaded at both ends and left blank in the middle. It is screwed into a tapped hole, the part



STUD NUT

it is to hold slipped over it and a nut screwed on. The stud usually is considered as a fixture and is left in place. In most cases where studs can be used cap-screws can be used just as well, and usually are considered preferable. Studs are proportioned like machine bolts and cap-screws and are not usually finished. When a stud has to be removed there are three common ways of doing it. A Stilson wrench may be applied to the plain part of the shank, which is not a good plan, as it roughens up the metal and to some extent weakens it and in any case makes it look very sloppy; two nuts may be screwed on one above the other and jammed together fairly tight, and the stud screwed out by applying the wrench to the lower nut; or a regular stud-nut may be used. As the illustration shows, a stud-nut consists of two parts, the body, A, and the screw, B. The body is drilled half way through and tapped to fit the stud thread, while the other half of its length is drilled and tapped for a comparatively fine-threaded screw. The body is formed with facets like a hexagon nut. To remove a stud, the stud-nut is screwed on as far as it will go and the set-screw is well tightened down. The application of the wrench to the body does the rest. It is usual to case-harden all the stud-nut parts.

Machine screws are driven into tapped holes and are made in sizes up to ⅜ of an inch in diameter, with three styles of heads, all slotted for the screwdriver blade. The flat-head machine screw has a head like that of a common wood-screw and is sunk flush by countersinking the hole. Where the head cannot be countersunk into the metal, the round head may be used. The third type is the "filister" or "cheese" head, which is a plain cylindrical head and may be either countersunk or left above the surface, as in the case of the round head. There are other machine screw heads, but they are of the "fancy" types; the three named are the standards. Machine screws are sold without nuts, though these can be obtained separately.

Set-screws are designed to prevent relative movement of two parts, such as a wheel on its shaft, by being screwed into one part while its end presses against or enters slightly into the other part. They are made with either square or hexagon heads, are finished all over and have hardened ends which are pointed, cupped or flat. It is common practice to prevent a set-screw from backing out by locking it with a nut and the nut itself may be locked with a spring washer.

Intended for wood-work, carriage-bolts are light and slender as compared with machine bolts. The standard head is round and shallow, so that it will not project much above the surface, and the shank for a short distance below the head is squared or else provided with ribs or fins so that when the nut is being screwed home the bolt will not turn in the wood; of course this cannot be prevented otherwise, as the head does not provide any hold for a wrench. A washer is placed under the nut of a carriage bolt to provide a good bearing surface and prevent the nut from being pulled through the wood, and also so that the nut will not tear the wood when being screwed home.

Of course there are many variations of all the standard forms of bolts and the like; but those described are the commonest. Threads vary in fineness—that is, the number of threads to the linear inch; but the United States standard thread is what is generally used, and that is what is handed out at hardware stores unless something special is asked for. In buying bolts the pitch of the thread does not matter much, as long as the nuts fit; but in the case of studs, cap-screws or set-screws care must be taken to get the proper thread for otherwise the screw will not go into place or, if too much force is applied, the thread will be stripped. What is known as the "automobile standard" thread is of finer pitch than the U. S. standard and cannot often be found in hardware stores. It is used only in motor car work, and renewals

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should be obtained from some motor car supply depot, where the thread will be familiar.

Threads cut on brass are finer than on iron or steel, and ordinarily a brass screw will not go into a hole tapped for an iron one. Sometimes, however, the brass screws are threaded with standard dies, so that in making use of brass this point should be looked into.

Ready Remedy for "Hard" Springs.

After a season's use, a certain amount of road dirt and rust will collect between the leaves of a car's springs, and as a remedy for the "hard" springs that result it often has been suggested that the body be jacked up until the leaves separate when the accumulation may be removed and replaced with a small quantity of heavy oil or grease. Cases where the remedy has proven of little or no avail are few and far between and still from abroad comes advice for a much more drastic method and one which must of necessity require more time and entail greater expense. It is suggested that the springs should be "taken down" twice a year, "say in March and November," and after having been thoroughly cleaned, remounted with a particular lubricating compound between the leaves. The compound is to be made of white lead and tallow, the proportions sufficient for a set of four springs being two ounces of white lead to one-quarter pound of tallow. The ingredients are boiled together and applied to the leaves hot.

Graphite for Leather-faced Clutches.

The slipping of a leather-faced clutch often can be prevented by the use of a little graphite belt dressing, which also tends to keep the leather in good condition. The use of too much, however, is apt to aggravate the slipping rather than otherwise.

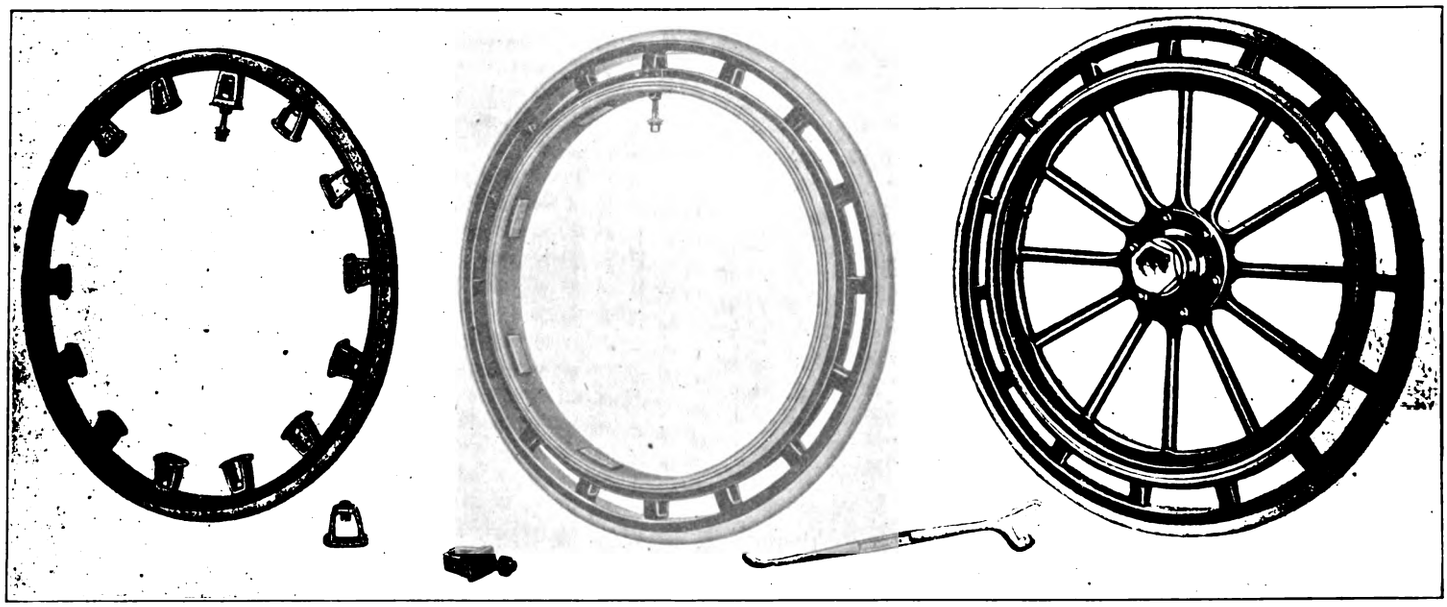
EMERGENCY TIRE OF NOVEL TYPE

Detroit Manufacturers Attack Old Subject from a New Angle—"Demountability" That Means All it Implies.

An emergency tire that without much stretching of the English language may be called a cross between a spare wheel and a spare tire has been brought out by the Detroit Emergency Tire Co., of 71 Larned street East, Detroit. The device, which is the invention of Samuel Davidson, is shown by the accompanying illustration and consists of a steel rim carrying a solid rubber tire, a series of brackets attached to the inner circumference of the rim which rest on the rim of the wheel, and a locking band which serves to hold the brackets in their proper positions when set. The Detroit emergency tire can be used on either demountable or quick detachable rims, or on rims of the straight side or Dunlop clincher type, but not with plain clincher rims. Various sizes are made to fit all standard rims.

The brackets are so attached to the emergency rim that they can be turned, and one of the brackets has a bolt which is passed through the valve hole in the wheel rim when the emergency tire is in place. In order to put the tire on, the brackets must be turned so that their greatest width will lie in the plane of the wheel; once the tire is on the rim, the brackets are turned at right angles to their former position, a special wrench being provided for the purpose. This has the effect of creating an outward pressure on the rim of the emergency tire, the pressure increasing as each bracket is turned. When the brackets are all set and the regular tire ring has been replaced, the locking ring which forms part of the emergency outfit is slipped on, fitting snugly between the tire ring and the brackets. By means of a steel screw, the locking ring is drawn down hard and held tight in its place, absolutely preventing lateral movement of the emergency tire on the wheel rim.

The outside diameter of the emergency tire is exactly that of the pneumatic tire it replaces, and consequently the differential is given no extra work through its use. It is far from bulky, comparatively speaking, for two can be carried in the space occupied by a single pneumatic tire. The manufacturers claim that the emergency tire is enormously strong, owing to the design of the supporting brackets and the quality of the material used, and that its cost is something like 30 per cent. less than the price paid for a high-grade pneumatic tire which has a corresponding diameter.



EMERGENCY TIRE, SHOWING THE SIMPLICITY OF ITS CONSTRUCTION

Oil Cooling for French Racing Car.

One French manufacturer who has a team of three cars entered in the forthcoming Grand Prix de France race which is scheduled to be run over the Dieppe circuit in two sections on June 25th and 26th, has adopted oil cooling in earnest. The cars are Sizaire-Naudin products and they are probably the most freakish looking of all those that have been entered, but the oil is not to be used in the cylinder jackets as might be supposed. In order to discourage the engines from becoming overheated to a degree that would interfere with their proper operation the manufacturer has added a supplementary radiator through which the lubricating oil is circulated. It is located below the regulation water radiator and consists of four rows of gilled tubes placed across the front of the frame. It is further utilized as a support for the license number plate.

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BRINGING BOOKS TO THE PEOPLE

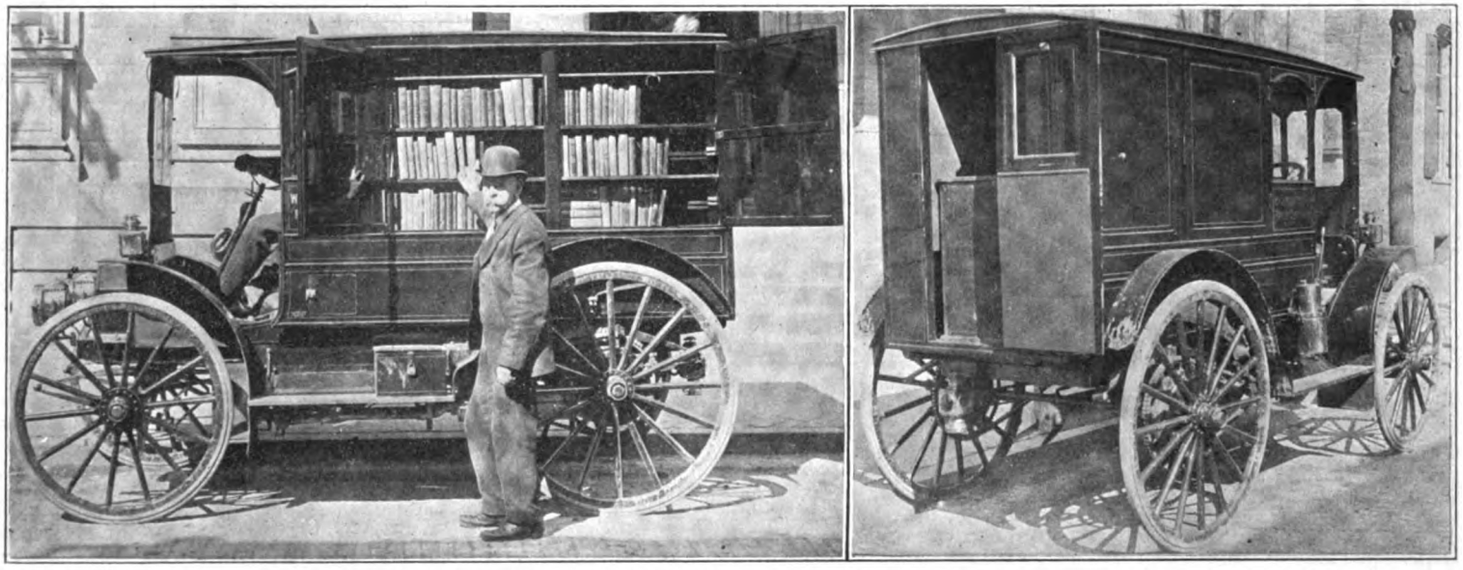
Maryland Library Carries the Circulating Idea a Little Further Than Usual—Motor Vehicle That Helps.

Though the transportation of books from central libraries in large cities to sub-stations located in out-lying districts is neither new nor novel work for a motor truck and has been resorted to on more than one occasion, the Washington County Free Library, which is located in Hagerstown, Md., has carried the idea a little further than is usual. In order that those who reside in localities or small towns where a library is not maintained may find food for thought in the volumes, a motor truck which just has been purchased has been converted into a miniature traveling library with a capacity for over 1,000 books. Its shelves are stocked with "best sellers," and other books that may be called for, before each trip to the sub-stations is made and those along the route who so desire may select volumes to be read and called for at some future date when next the truck passes in the vicinity.

The motor wagon is the product of the International Harvester Co., Chicago, Ill., and takes the place of a horse-drawn vehicle which was in use for some time and which permitted the Hagerstown library to build up a reputation for circulating books in out-of-the-way places that has reached far and wide. The book-case wagon was wrecked in collision with a railroad train and in seeking to replace it, the library has still further increased its field of activity by purchasing the motor book-case wagon which permits of more rapid delivery and a very much greater radius of action. Two views of the new wagon are shown herewith, one showing the side doors closed, when it has the appearance of an ordinary delivery wagon, and the other showing the doors open and the shelves of boks. The vehicle is equipped with a 20 horsepower motor and except for slight modification to permit of extended trips over rough, mountainous roads, the chassis is stock. Though there is only one vehicle of the kind in use at present, it is expected that several others like it will be put in service in the near future, as this one has proven popular and of great service.

Upsets Court Practice Affecting Tail Lights.

According to a decision of the High Court of England, it no longer is possible to hold and fine a motorist for failure to have his tail lamp lighted provided he can prove it went out by accident and that "he had taken all steps reasonably practicable to prevent the license number being obscured or rendered not easily distinguishable." The case is considered to be an important one abroad, where it appears that tail lamps are even more prone to extinguish themselves than is the case on American soil and where the police have been unusually active in prosecuting those whose lamps fail to shed the required glimmer on the license plate. The case was virtually a test of the law and was conducted by the Royal Automobile Club, the offender being a member of the club. In defending the motorist, the solicitor admitted that the lamp was not burning when the arrest was made, but stated he proposed to prove that as is prescribed by the motor car laws, the motorist ha dtaken the necessary precautions to see that the lamp remained lighted, but that it had been extinguished by accident. The magistrates held that it was no defense, however, and the case was appealed to the High Court, which held that the magistrates were wrong and ordered the case to be reheard. Having proven his point, the motorist was dismissed with a warning.



HAGERSTOWN'S I. H. C. DELIVERY WAGON THAT SERVES AS A "CIRCULATING" LIBRARY

BRAKE TESTS ANSWERED QUESTION

Aldermanic Effort to Evolve Ideal Ordinance Provokes the Inquiry and Response—What Tests Demonstrated.

New York city's Board of Aldermen is trying to evolve a fair and effective speed ordinance and, not content with discussing the proposition as do some civic bodies, has made practical tests and has journeyed about the city in motor cars to ascertain real conditions. First they drove through thoroughfares having all manner of traffic and took note of the effect. The question then arose as to how quickly a car can be stopped in an emergency. Charles G. Stewart, general manager of the Automobile Dealers' Association, said: "One second." The aldermen were unconvinced, so they and a number of automobile men went to Brooklyn for a test. The mathematicians in the party figured out that Stewart's "second" meant a distance of 22 feet at 15 miles an hour, 30 feet at 20 miles and 44 feet at 30 miles. To test the theory distances were marked off and an alderman stood the prescribed distance from the point where the chauffeur was to grab the brake handle. At 15 miles the car, a Thomas 6-40, was stopped in 14 feet, 10 inches, a safe margin of 7 feet, 2 inches. At 20 miles the car stopped in 25 feet, a margin of 5 feet. But at 30 miles an hour the car, instead of stopping in its 44 feet, slid 55 feet, 11 feet over the limit, and the alderman who had been obliged to jump out of the road to save himself decided with his fellows that 30 miles was no safe speed, although 20 might do. These tests were on a macadam road. On asphalt the distances were: 20 miles, 28 feet, 3 inches; 30 miles, 83 feet. With smooth tread tires the distances were somewhat less.

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Tacoma Speed Carnival Takes Shape.

With the taste of the recent road racing at Santa Monica scarcely out of their mouths natives of the Pacific Coast in the State of Washington, and in particular in the city of Tacoma, are looking forward with much gusto to another road racing event of almost equal importance that is due to be run in connection with "Montamara festo" on July 5 and 6, next. Four events are planned for the two days' racing which will be over a circuit in Pierce County in the famous Tacoma gravel prairies. The course is five miles in circumference and on Friday, July 5th, the light cars in three divisions, under 230 inches, 231-300 inches and 301-450 inches displacement, will be sent around the course for 100, 150 and 200 miles, respectively. Saturday has been reserved for a class D, non-stock free-for-all and the cars will be required to run 250 miles, or 50 laps of the course. In view of the fact that $10,000 in prize money will be distributed, half going to the winner of the free-for-all and the other half being split up among the winners of the other classes, it is expected that there will be little difficulty in obtaining well-filled entry lists. Whether or not Fred Wagner will officiate as starter, as he has for all really big races almost as long as any one can remember, remains in doubt as he is due to start the beach races at Old Orchard, Me., on July 4th and his presence on the Pacific Coast hinges upon the possibility of his release by the beach race promoters.

Exceeds Speed Limit to Please Baby.

That the motor car is productive of ingenuity on the part of the owner is often demonstrated when motorists are obliged to appear in Police Court where the excuses they devise for speeding put the small boy's "deceased grandmother's funeral" on baseball days far in the shade; and despite the fact, some of the excuses are true even if they are novel. One which is entitled to a laurel wreath was offered in the police court in Indianapolis, Ind.., one day last week by Willard Spring when he was charged with exceeding the speed limit. Spring said he did it to please a friend's baby. The baby in question clapped his hands in glee every time Spring opened the throttle another notch and Spring declared he did not realize he was making 32 miles an hour. The child's father said he felt honor bound to pay the fine and showed his sincerity by paying it.

Elgin Eliminates Stock Car Events.

There will be road racing at Elgin, Ill., this year after all and on August 24 unless the entry list fails to fill or something else puts a crimp in the plans of the Chicago Motor Club which as heretofore has the undertaking in hand. But it will not be stock car racing as defined by the rules of the American Automobile Association, and thus the only strictly stock car event will become but a memory. One of the reasons for the change is that up to the present time only 16 manufacturers have registered their latest models with the A.A.A. and none of them has signified any desire to enter or to reenter racing. Which has led the Board of Directors of the Chicago Motor Club to the conclusion that manufacturers are practically through with stock car racing and the other reason is that rather than give up entirely the idea of staging some sort of races, the Contest Committee of the club has taken the half loaf, figuratively speaking, in preference to no bread at all and will stage the non-stock events. Two races will be run on the same day, one for cars in the 231-300 inch class and the other for cars up to 600 inches displacement.

Two-Day Racemeet for Chicago.

According to present plans and the asseverations of Homer C. George, who has the affair under his wing, Chicago is to have a two-day racemeet on June 8 and 9 that will be an eye-opener. Sanction for the event already has been issued by the American Automobile Association and if Hawthorne track can be prepared in time, the meet will be the first to be run under the revised contest rules which just went into effect. But there is some question as to whether the track really will be ready on the specified dates. At present, it is undergoing a very thorough manicuring and if it turns out as well as is expected records ought to go by the board, or rather by the asphalt, for the track is being given a brand new top dressing of what the Standard Oil Co. styles 80 per cent. asphalt petroleum. It is expected that by reason of the proximity of Indianapolis and the presence of a number of bright and shining stars, little difficulty will be experienced in obtaining a list of entries which will make the event a success.

Algonquin Hill Program is Altered.

In view of the fact that a comparatively small number of manufacturers have registered stock cars for the current year with the American Automobile Association, and inasmuch as there seemed little likelihood of the number being materially increased by June 20th, which is the date for which the Algonquin hill climb is scheduled, officials of the Chicago Motor Club, which organization annually fosters the event, have wiped out two of the five stock contests and otherwise altered the program out of all semblance to its customary form. The first event, which heretofore has been run under class A rules has been changed to come under class E and will be run in two divisions of seven classes, each on price classification. The second event has been changed from stock to non-stock and the third event remains non-stock and is to be run in two divisions for cars of 300 and 600 inches displacement, respectively. The fourth event will be a free-for-all, as was the case last year, and the last will be a class B stock car event.

Vents Hatred of Cars With an Axe.

Automobile haters, which class slowly is becoming extinct, have displayed considerable ability in inventing a multiplicity of schemes for the annoyance of motorists and while the most common has been to scatter tacks in the road, a Wabash, Ind., man, Ora Abshire by name, may safely be awarded the ribbon for originality and effectiveness of method. Ora, it seems, doesn't like "ortermobeels" very well, and when a car belonging to the Fisher-Gibson Co., of Indianapolis, was being driven through Ora's locality the Wabash man displayed what might be regarded as an indication of Indian ancestry or association and let fly at the car with an axe. There was no taunting laughter as the car disappeared in a cloud of dust. It didn't disappear. It stopped; for the aim of Abshire was true and there was a fine hole on one tire. Of course Abshire was haled into court and there he was assessed $57.40 damages, but his love for motor cars maintains about the same status.

Boys in Syracuse, N. Y., also have a method of annoyance which is unpleasant and offers possibility of damage. Last week one of a gang threw a dirty burlap bag into the face of the chauffeur driving Harold MacGrath's car and collision with a telephone pole nearly resulted. MacGrath, besides being an author, is some sprinter, and he managed to catch one of the offending youngsters and turned him over to the police.

Jailed Passengers, not Chauffeur.

Occupants of automobiles which exceed the speed limit are the guilty parties and not the chauffeurs, according to Magistrate McFarland, of Philadelphia, Pa., who did not hesitate to voice his opinions last week when a speeding case came up in Central Police Court. The judge announced that hereafter he will hold the passengers instead of the chauffeurs. As evidence of his sincerity he did the rather unusual thing of sending to the House of Correction for thirty days each two fashionably dressed young women who were riding in a car which struck an aged evangelist. In court the chauffeur said he was hardly to blame as the women kept telling him to drive faster or they would leave his car and get a driver who was not afraid to "let 'er out." The judge asked the women if the story was true and when they said it was the axe fell.

Cincinnati Club to Hold Efficiency Run.

On Saturday, June 29th, the Cincinnati (O.) Automobile Club will conduct an efficiency contest over a 40-mile course, leading from Government Square to Hamilton, and then to Venice, and finishing at the Automobile Country Club Home on Colerain Pike. The quantity of fuel, in weight, required for the trip, divided into the complete weight of car and passengers, will be the basis upon which the winner will be evolved.

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STEEL SPRINGS OR COMPRESSED AIR—WHICH?

"Designing Engineer's" Assistant Makes Odious Scientific and Mathematical Comparisons—Why Air Is Likely to Remain Supreme as an Absorber of Vibration—Qualities Inherent in Springs That Baffle Resilient Wheel Inventors.

"What are those drawings—designs for those bottled heat units you talked about the last time I dropped in?" laughingly inquired the man from downstairs as he settled into a chair in the designing room during the noon hour, and indicated a couple of drawings which occupied an inconspicuous corner of the draughting table used by the Designing Engineer's second assistant.

"No; those drawings are designed to demonstrate that spring wheels and spring tires are—"

"I thought you'd come to them sooner or later," interrupted the man from downstairs. "But do you know that since the last time we had a real good talk I have become possessed of the notion that there is something in a spring tire or a spring wheel after all, and that some time or other they are bound to cut a figure in the automobile industry. I was looking over some back numbers of the Motor World only recently and the illustration and description of George Westinghouse's air spring gave me quite an idea. I think that if the Wetsinghouse design was carried further it would—"

"Stop dreaming," in turn interrupted the Designing Engineer's assistant, as he reached for the drawings on the table. "If you will hold your horses long enough, I'll show you a thing about spring tires and spring wheels of which you never thought."

"When you set about doing it," responded the man from downstairs, "tell me why it is not possible to incorporate around the periphery of the wheel a number of such cylindrical air springs as Westinghouse uses and cover them with a flexible cover of some sort that will not impair the movement. It seems to me that a device of that sort would constitute a modified pneumatic tire."

"As only thirteen or fourteen thousand spring wheels and spring tires have been patented, it is pretty safe to say that you have discovered nothing new; but, as I tried to say, I've given the subject more than casual thought and these drawings have pretty well convinced me that it will require almost a complete overturn of mechanical principles and other things before either the spring wheel or the spring tire displaces rubber tires or obtains a real foothold." Having said which the young engineer bent over his drawings, remarking as he did so:

"Follow me for a while, and I will show you with the aid of the two sketches just why resilient wheels and the like cannot compare with the pneumatic tire for elasticity, and consequent easy riding qualities. The sketch here represents an ordinary 34 x 4 shoe. When placed on a car which weighs, let us say 2,500 pounds, some slight deformation will take place at the

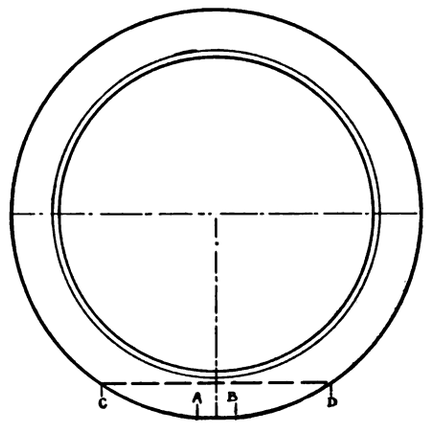


FIG .1

point of contact as you know, and I have represented this flattened portion as the distance between A and B. If the tire is inflated to 90 pounds pressure a square inch and the weight of the car is evenly distributed on all four wheels, the area of the circular figure of which A B is diameter

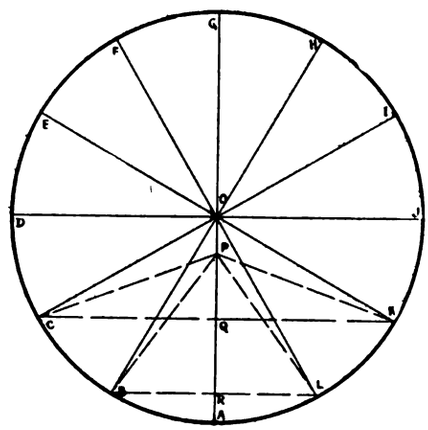


FIG. 2

is 625/90, or approximately 7 square inches, which will make the diameter 3.2 inches.

"If sufficient force is exerted to cause the periphery of the tire to be flattened along the line C D, which is spaced three inches from A B, and which we will consider as the maximum compression point attainable without causing rupture of the shoe, you can very readily see that the pressure between the tire and the earth will be greatly in excess of that exerted when the compression line was at A B, for not only is the pressure of the air greater within the tube, but the area of the portion of the tire in contact with the earth is greater. We can approximate this pressure without a great deal of trouble. I calculate that the volume of the tire is decreased by one-seventh when the tire is so depressed, and as a consequence the final pressure is 7/6 x 90 or 105 pounds to the square inch. The area this pressure acts upon we can consider as being enclosed in a quadrilateral which has as diagonals the line C D and a distance of six inches which represents the spread of the tire at the maximum point. Now C D scales 19 inches on my diagram, which makes the area of the portion in contact with the earth 57 square inches. The total pressure then is 57 x 105 or 5,985 pounds.

"Just glance at this second diagram, which represents a spring wheel with the springs placed in the spokes, there being as many springs as there are spokes in the ordinary rear wheel of a motor car. The felloe of this wheel is not flexible, the term applied to a wheel of the design being "floating hub type." The springs are compressed by the weight of the car and the action of the rough spots of the road. You can see that five springs C, B, A, L and K help to support the weight of the machine. If the wheel is correctly designed, the tension of the springs is such that the point O is not sensibly removed from the center of the wheel by the compression of the springs under the normal load, 625 pounds. This tension is the same in each of the springs, and with the aid of the diagram and a few figures I will determine it. Of the five springs which tend to support the axle O, but A works in a vertical path, the others all making an angle with the vertical, and as a consequence the effects of the other forces in supporting the axle are dependent upon the angularity. The effect the spring C has toward supporting the weight can be determined by resolving the force represented by line C O into two components, one (O Q) in a vertical path and the other (C Q) in a horizontal path. Now the force acting along the vertical path, is to the tension of the spring as the length of the line O Q, is to the length of C O. O Q scales as 8.5 inches while the length of C O which is a radius of the circle is 17 inches. Then 8 5/17 of the tension of the spring C

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helps to support the vehicle. Similarly, the same fraction of the force exerted by spring K assists in supporting the axle, while for springs B and L the fractional part of the spring tension is 14 6/17. If now we consider the tension of the springs as X, we can write the following equation: $X + 2 \times 14.6X/17 + 2 \times 8.5X/17 = 625$ pounds, the weight of the machine when solved gives X as 169 pounds.

"Now, suppose I subject this spring to a pressure which will cause the center to approach the ground a distance of three inches, just as I did with the pneumatic tire, and determine the magnitude of the force which will produce this movement. The spring A assumes a new length, 14 inches, and since the tension of a spring is inversely proportional to the length when under compression, the new tension in the spring A is 1 7/14 × 169, or about 205 lbs. By again resolving the forces exerted by the springs C and B, and L and M according to the new angles through which they act on the hub or axle, and considering the increased tension of the same springs because of the compression, I determine that the effective vertical components of C and K added together make 130 pounds, while the vertical components of B and L make 315 pounds. The force necessary to produce the deformation alluded to is therefore 205 + 315 + 130, or 650 pounds, which you can see scarcely is in excess of the original weight of the vehicle.

"Doesn't this make plain that if a machine equipped with a spring wheel of the type described were to meet an obstruction at such velocity that a force of 5,935 would tend to deform the wheel, the movement would be very much in excess of the three-inch movement which would take place in a pneumatic tire under the same conditions? There is just one other point in connection with that type of wheel that I wish to emphasize. In the example we have been considering, I have taken the length of the springs as 17 inches, the full length of the spoke. If the springs are half of this length, for the same amount of movement the pressure will be double the 650 pounds. By halving the length of the springs the pressures can be made larger and larger so that you would think that the same results finally could be attained with such a wheel as with the rubber pneumatic, but a moment's consideration will dispel that thought. If the springs were made one-eighth the length of the spoke, or 4½ inches long, they would support in round numbers 5,000 pounds when the axle went through a space of three inches, but do not for a moment imagine that a spring can be produced which is capable of compression to one-quarter of its original length without exceeding the elastic limit of the material from which it is constructed. By increasing the cross section of the springs, the tension is increased, and this can be continued to such a stage that the spring wheel will support jolts just as heavy as any pneumatic, and with no more movement, but at the expense of the resiliency of the wheel, when the smaller jolts are encountered so that in ordinary driving, the wheel is not nearly so 'easy riding' as a pneumatic.

"As for spring tires, I think I can show you in few words wherein they are inadequate. Let us consider an ideal device of the type, which we will say consists of a perfectly flexible covering so filled with springs that a pressue of 90 pounds is exerted in an outward direction for every square inch of the tire surface. You can understand that, as was the case with the pneumatic tire, seven square inches will come in contact with the earth when the normal wheel load is supported. When, however, a force sufficient to cause a three-inch deformation in the periphery of the tire is applied it is only the springs in immediate contact with the surface C D which are affected, whereas with the pneumatic the pressure throughout the whole tire was affected. The same effect is obtained, as would be obtained with the pneumatic if the passage of the air were stopped at C and at D. You can see for yourself that the pressure would go away up, and the resiliency of the tire would be curbed. At that, we have been considering the best of them. In actual practice, the mechanical difficulties encountered limit the number of springs so that even pressures for the total tire surface are not obtainable, so that in order to prevent 'bumpiness' a covering which is not nearly so flexible as the shoe of a pneumatic must be applied, which further limits the elasticity of the spring tire.

"Last but not least comes your 'modified pneumatic' idea. If, as in the case of the spring tire, you could so far overcome, or circumvent, the mechanical difficulties involved, and produce a tire with a sufficient number of compression cylinders so disposed under a perfectly flexible covering so that an initial pressure of 90 pounds to the square inch could be attained evenly throughout the entire surface of the tire, and if the compression chambers of all of the cylinders were connected together so that a change of compression in one would cause a like change throughout, then would you obtain the same or equal results as you would with a rubber pneumatic. You can see that the constructional difficulties are too many, that the production of such a number of cylinders would be impractical, and a reduction of the number would involve the necessity of the adoption of a more rigid covering. Then too, only blows which struck the tire normal to the periphery would be entirely absorbed by the device, for the line of action of each of the cylinders corresponds to the direction of a radius of the wheel so that only the components along the radial paths of forces which strike the wheel a glancing blow would be absorbed. I scarcely think that sufficient of the mechanical difficulties can be overcome to make the device at all practical.

"As for the cost, judging by the prices charged for the resilient wheels now offered, I should say that the initial cost would be as great or greater than the cost of a shoe. In order to render the rolling of the wheel silent some sort of a tread would have to be applied, and what have we that compares with rubber, for efficiency, cost, and ease of application? Nothing as yet; so that it is safe to say that a rubber tread would be supplied, and don't you think that rubber will wear off of a resilient wheel as quickly as it will from a pneumatic tire? Wherein then is the economy?"

"But the saving in trouble!" protested the man from downstairs.

"Now look here," with emphasis from the assistant. "On a pneumatic we are troubled with punctures, which readily are repaired and with blowouts which necessitate the change of a shoe, but comfort is the chief result sought and obtained. With a spring wheel we are troubled with a 'set' in a spring or a break in a spring which necessitate replacements, a job which is not very simple, and moreover the whole machine is subject to greater strains due to vibration, while the occupants never are as comfortable as when pneumatic tires are fitted to the car. The amount of trouble that might possibly arise with your device, were a plunger to stick, or the oil to leak or any one of a dozen or more similar accidents to befall your modified tire, I would hate to predict.

"I have not touched on the inertias in—"

"Never mind the inertias," interrupted the man from downstairs. "The story as it now stands is sufficient to point out the defects of the device, and besides it is getting late and I've a half-day's work still to do."

When Fan Speed May be Deceptive.

It is not always possible to judge the effectiveness of a fan by watching it whirl when the engine is running. While the fan may rotate at what seems to the eye to be a high speed, it may be handling much less air than it should handle, because of slackness of the belt. When the belt is slack it is apt to slip so much so that the fan will gather speed much more slowly than the motor and, on the other hand, it will continue to spin after the motor has stopped. It requires considerable power to drive a fan at high speed, and if the belt is loose the requisite energy cannot be transmitted. A little belt dressing sometimes helps, but there is nothing that will take the place of the right belt tension.

Mystery in Closed Tank Vent.

It is quite generally known that unless the vent in the tank of the gravity feed variety is free and clear from obstruction, irregular action and final stoppage of the motor will result. It sometimes happens with the under-seat position of the tank that the vent is embedded in the soft leather of the cushion, so that when a passenger is seated in the seat the passage is effectually blocked and an apparent "mystery" results.

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CHANGING BATTERIES MADE EASY

Simple Contrivance That Greatly Reduced Labor Necessary—Enabled One Man to Perform the Shift.

It not infrequently happens that heavy electric trucks are put to work under conditions of such severity that a change of batteries is necessary at noon, but at places where there are no facilities for doing the battery changing and where any apparatus involving much expense would be out of the question. Owing to the great weight of the average lead battery, it is a matter of no little difficulty to change batteries without some sort of labor saving arrangement, but such arrangements are possible by the exercise of ingenuity and a small amount of ordinary mechanical skill.

The lay-out shown in the accompanying diagrams was used with very satisfactory results in connection with a very heavy machine; the battery consisted of 48 cells of 21 plates each and was divided into six sections. While it was all two men could do to lift one section, changing was easily accomplished by following the plan described below, and, in a pinch, one man could do the work and the effort was not too great for the single workman.

In the rough garage where the machine was kept two heavy benches were built of rough material, each bench some three or four feet more than twice the length of the battery as it stood in the truck, and of the same height as the floor of the battery compartment. These benches were placed parallel to each other, a sufficient distance apart so that the truck could be driven between them, leaving a foot and a half or two feet to spare on each side. An oak bridge that would reach across from the battery bed of the truck to the benches completed the apparatus. The operation of changing batteries was carried out thus:

The spare battery was laid out on the benches as shown in Fig 1, one section of three trays at A and the other on the diagonally opposite space at D. The truck was driven in and stopped when the battery box was opposite the empty bench space at C. Placing the bridge in position, the three sections of the battery nea.est the space C were moved out on rollers of small iron pipe and left standing on the bench while the truck, under the power of the remaining half battery, moved up until the empty space in the battery box came opposite the fresh half-battery on the bench at D. This was put in place of the trays just taken out and three exhausted trays on the opposite side rolled out onto space B. Still under half a battery, the truck was moved back until the fresh half-battery at A could be rolled into the box, completing the change. This can be done easily in half an hour by two men, and with practice the time can be cut down to twenty minutes or less.

While the truck was at work the battery on the benches was put on charge. The trays were connected together as they stood on the benches, three in a group, and the two groups connected together by a cable reaching across from bench to bench—a simple series connection. The two supply cables were connected to the remaining tray terminals and the current turned on from the switchboard. In connecting the trays together short jumpers, similar to those used in the truck, were employed. The long cables were flexible and heavily insulated and provided with terminals simlar to those on the jumpers. Fig. 2 shows the connections.

The batteries being out on the benches while charging, they were in plain sight and could be watched while charging, and anything abnormal at once corrected. This is a consideration of some importance where the batteries are being drawn upon for a heavy and constant current. Only one charge per day is necessary, as when the machine is brought in at night the charging current can be connected direct to the battery in the car, which will be ready for work in the morning. This also makes it unnecessary to hurry the charging of the battery that is on the benches.

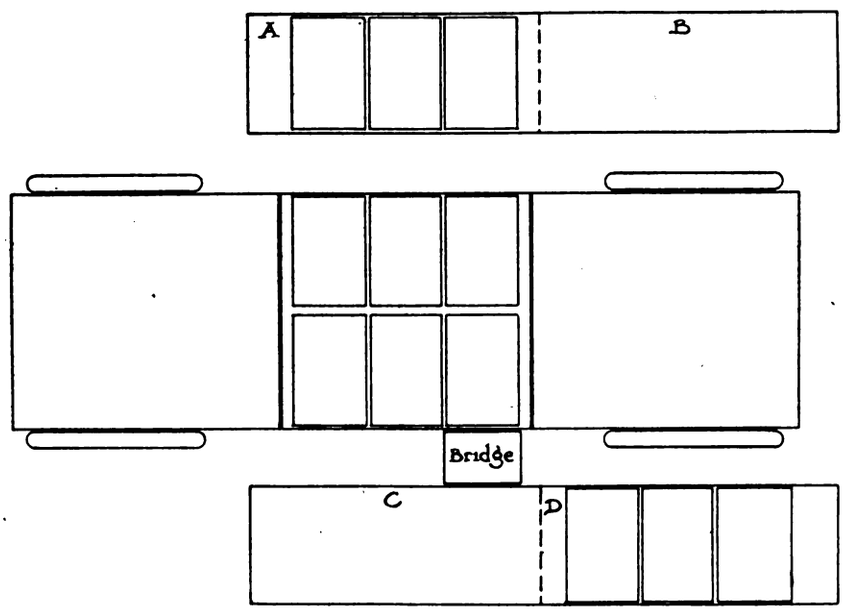
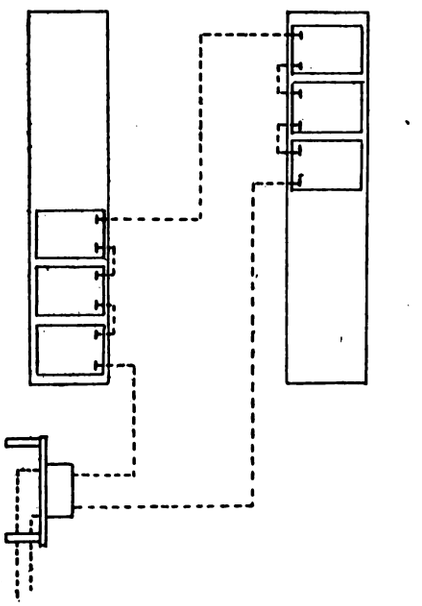


DIAGRAM OF INEXPENSIVE BATTERY SHIFTING APPARATUS



WIRING DIAGRAM FOR CHARGING

Generating Current at Slow Rotative Speeds.

The generation of current at very low rotative speeds is not usually considered one of the strong points of very small dynamos, such as are used for the production of electricity for ignition and illumination in motor cars; yet it has been shown by the Apple Electric Co., of Dayton, O., that it is possible to make a small high-speed machine that is effective when running very slowly. By way of experiment the terminals of an Aplco model A4 dynamo were connected to a 6-volt 2-candle power lamp and the shaft turned with the fingers. Notwithstanding the feebleness of the impulse and the slow speed, estimated to be not more than 150 r. p. m., the current generated was sufficient to make the lamp glow quite perceptibly.

Relation of Burners and Reflectors.

In the construction of motor car headlights the reflectors are designed with a great deal of care with reference to the burners that are to be used. Owing to certain optical laws that persistently refuse to change, the use of a burner of larger size than that for which a reflector is designed results in so little improvement in the amount of light projected that it is not worth while, provided the original burner is working up to capacity. The rule applies equally well to acetylene and to electric lights.

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MAKES CARBON HELP REMOVE ITSELF

Cyclean System as Developed Abroad—How it Operates to Cause Offending Substance to Aid Own Combustion.

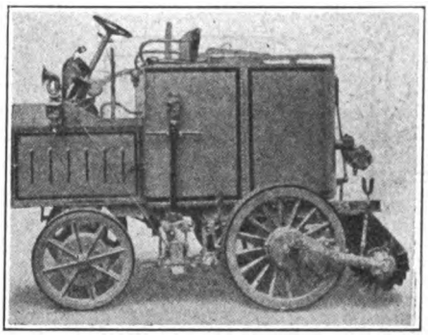
That those who may have been deterred in the purchase of an electric vehicle by the thought of the necessity of entrusting it to a public garage to be charged may have no further qualms on this score, the Electric Products Co., Cleveland, O., has developed a mercury arc rectifying charging apparatus that is designed for home use and that is absolutely automatic in operation regardless of the condition of the battery put on charge. Consequently it requires no skilled attendance—in fact no attention whatsoever is necessary once the vehicle is connected and the current turned on—operations which may be performed by the veriest novice.

The apparatus is styled the Wotton Automatic Rectifier, the "automatic" in the appellation applying specifically to that part of it which cuts off the current the instant the battery has received the proper charge. In attaining this desirable result, time switches or other apparatus are not relied on, the current being cut off directly by and through the battery itself. The whole apparatus includes a small switchboard which mounts the mercury arc rectifier, used in transforming alternating current, which has come into such general use, into direct current, the usual array of line and battery switches, and a high-class combination volt-ammeter. It is the latter instrument on which the system depends for its automatic action. As the voltage of the battery on charge rises, the volt-meter pointer traverses the dial scale until it reaches the face-plate pointer which has been set at a point equivalent to the ultimate voltage of the battery. Both the volt-meter pointer and the face-plate pointer carry contacts and immediately they come together, which they do when the voltage of the battery has reached the predetermined limit, the circuit through an auxiliary relay is closed and the charging current is automatically cut off by disconnecting the mercury arc. After the current has been cut off the two pointers remain together until the plug is pulled out of the car as a positive visible evidence that the battery has received a full charge.

By reason of the fact that the charging current is controlled by the voltage of the battery itself a battery in any condition of discharge, whether quarter, half or three-quarters charged, may be plugged in and practically forgotten for the time, discontinuance of the charge being automatic immediately the voltage rises to the proper limit. Another advantage of the apparatus is that it may be left to charge a vehicle at night without attention, while the advantages of home charging with the vehicle close at hand and the elimination of trips to a garage which mean lessened battery and tire mileage are obvious.

Front Wheel Drive in German Sweeper.

Opinions differ very widely as to the merits and the demerits of front wheel drive systems, but it is reasonably clear that the advocates of rear wheel drive have very much the best of the argument, so far as practical application is concerned. It is beyond question, however, that there are special cases in which front wheel drive is the only practicable method of propulsion, and in such cases it usually does the work in a manner that could not be improved upon by the more familiar arrangement, a fact which aptly is illustrated by the electric front wheel drive street sweeper shown in the accompanying illustration. It is a German machine, built by the Norddeutsche Automobil and Motoren Aktien Gesellschaft, of Bremen-Hastedt, for the city of Berlin.



BERLIN'S ELECTRIC STREET SWEEPER

A single machine first was built as an experiment, and since its satisfactory trials others of the same type have been ordered. The reason for the adoption of front wheel drive in this case is found in the fact that the sweeping mechanism is located in the rear and is driven from the rear wheels, and the wet, muddy and generally sloppy condition of the rear of the vehicle makes it a very poor place for motors; besides, there would be no rom for them. Each front wheel is driven by its individual motor, hung on what is practically part of the steering yoke and swinging with the wheel as it is deflected in steering. Drive is through nickel steel gearing, calculated to give the requisite reduction, the final gear being bolted to the inner side of the wheel and enclosed in a casing which also forms part of the motor support. The battery, of 40 cells, is carried in front under a ventilated hood and current is conducted to the motors through flexible cables, having sufficient slack to permit the necessary movement in steering. The controller is built around the steering wheel column.

One of the characteristic features of the sweeper is that it is capable of turning in a 19-foot circle. Carrying a 600 gallon water tank, it can make eight miles an hour; the working speed, however, is five miles an hour. It will sprinkle and clean a strip seven feet wide.

FOR CHARGING ELECTRICS AT HOME

Cares and Worries of Supplying "Juice" Greatly Lessened—Automatic Rectifier That Serves the Purpose.

It is one of the disadvantages of all automobile engines that sooner or later a certain amount of soot and other residue, commonly styled carbon, accumulates on the tops of pistons and on the walls of the combustion chamber. The amount varies according to the construction of the engine and its operation in different hands and inasmuch as no satisfactory method of preventing the accumulation has been developed it has remained for remedies rather than for preventives to relieve the condition.

Up to the present time nothing has proven so efficacious as removing the cylinders and scraping the deposit away with suitable tools. That is the only way in which all the carbon can be removed, but the method itself suggests the disadvantages of the system: The loss of time occasioned by dismantling the engine and the difficulty of obtaining adjustments that will permit of as good results as were obtained before the operation was attempted. Liquid carbon removers which act to dissolve the deposit which later is blown out the exhaust pipes are fairly satisfactory. They relieve the immediate cause of the trouble but unless they are used with discretion there is danger of fouling the exhaust pipes and the muffler. Practically the same objection may be raised against the various mechanical removers, such as chains and balls, that have been suggested, though the danger of fouling the pipes is less because the deposit then is removed in a practically dry state and is more likely to be blown out than to adhere to the passages.

In attacking the carbon removal from the standpoint of efficiency, with due regard to the time required for the operation, a British company has evolved an entirely new system that is new and as unique as it appears to be efficacious. It is styled the Cyclean system and after extensive demonstration by the company, which holds the patents which cover it, it has been adopted by several large and well-known British and Continental automobile manufacturers as an adjunct to their service departments. The Cyclean system is built around the theory that the deposit, containing a fair percentage of carbon as it does, is readily combustible. It will not burn alone, however, or there would be no deposit. Consequently there must be supplied some agent that will support combustion in the accumulation and for this purpose a tank of compressed oxygen is used.

The modus operandi of the system is quite simple and it is said that from 2½ to 3 hours time is all that is required to clean the ordinary engine thoroughly, no

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disassembling or dismantling being necessary except that the spark plugs and valve caps must be removed. The engine first is run until it is at about the temperature that obtains during ordinary running conditions, when it is stopped and the plugs and valve caps removed. As oxygen gas will not burn by itself, though it supports combustion, it is necessary to ignite the carbon and for this purpose a small gas jet, either acetylene or ordinary lighting gas, is used. Immediately the carbon being ignited the oxygen jet is directed on the spot and the carbon burns up almost instantly and flies away in the form of a myriad of sparks. When the carbon has been burned away in one spot the oxygen jet must be shifted to impinge on another and if in the interim the carbon has ceased to burn the other gas jet is used to ignite it. The oxygen is supplied to the jet at a uniform pressure of 15 pounds to the square inch, a reducing valve being used for this purpose. Though it might be supposed that the intense heat generated might have a deleterious effect on the pistons and the walls of the combustion chamber, such is not the case. It is explained that though the heat really is intense its application is but momentary at best for the carbon is burned almost instantaneously. The cost of removing the carbon from a four-cylinder engine by the Cyclean system is said to be lower than the cost of removing the cylinders and scraping the deposit out, and in any event the operation requires considerably less time.

Here's a Telltale for the Tail Light.

Apparently, British chauffeurs are not as wise as are their American cousins, or it may be that the structure of the buildings in London and environs differs materially from that which obtains in the majority of the large American cities. At any rate, it is a very well known custom for American drivers to ascertain whether their tail lamps are performing as they should perform by watching for a reflection of the light in a window as the car passes. Whether foreign drivers are "up to the dodge," as they themselves might say, does not appear, but a well-known British firm just has brought out a new tail lamp that shows a white light to both right and left. The light that shines to the left is intended to illuminate the license plate, of course—it must be attached at the right side in London at least—and the other is designed to act as a telltale.

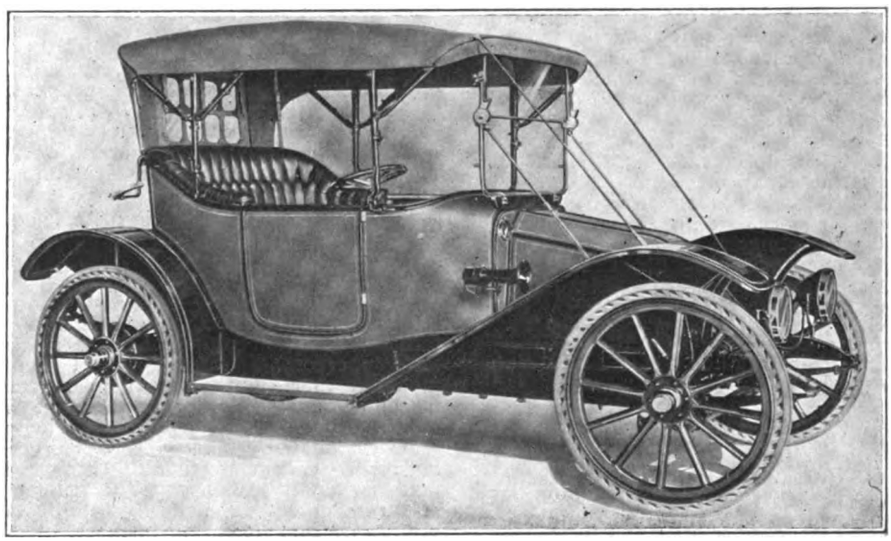
To Get Moist Air for Carburetters.

It has been suggested that as some motors seem to run better when the air is damp, it would be a good idea to run the air intake of the carburetter to the radiator filling cap, so that the steam and moisture due to the heating of the water will be drawn into the motor even when the weather is dry. If the intake pipe is fairly high there will be little or no danger of taking in water in case of boiling.

ARGO ELECTRIC OF GASOLENE TYPE

Saginaw Manufacturers Add Another Attractive Model to Their Line—Enlarging Factory to Meet the Demand.

In the earlier days of the storage battery the mileage radius of an electric motor car with a battery of moderate weight was decidedly limited, and for this reason, as well as on account of the very moderate speeds which went hand in hand with small battery capacity; electric pleasure cars were considered suitable only for short distance work within a circumscribed area with the charging station as a center. With the very great improvements that have been made in batteries, however, the speed and the radius of action of the electric have been so increased that they are equal to any demands likely to be made upon them, and it now is possible to build a car that combines the smooth, noiseless running of the electric motor with reasonably high speed and a radius of a hundred miles on a single charge.



ARGO "GASOLENE TYPE" LONG DISTANCE ELECTRIC ROADSTER

A rather notable example of an electric car of the long-distance, speedy type is the Argo roadster, which just has been added to the productions of the Argo Electric Vehicle Co., of Saginaw, Mich. As the accompanying illustration very clearly indicates, the general appearance of the car is that of an extremely up-to-date gasolene runabout—in fact, the makers refer to it as their "gasolene type roadster. The battery, as is usual in cars of this type, is carried under the hood, forward; the driving mechanism is of the standard Argo design, with shaft drive, and is very free from noise. A speed of 25 miles an hour can be attained, and one charge of the battery is sufficient to carry the machine a total distance of 100 miles—which is a great deal further than most people care to travel in the course of an ordinary day's outing. A wheelbase that is long for a car of this type—110 inches—and the placing of the back axle well to the rear, together with the easy spring suspension for which electric cars are noted, combine to make the new Argo a comfortable machine to ride in.

In order to make room for the plant necessary to increase its output of cars, the Argo company is building a two-story brick addition to its factory measuring 120 x 122 feet; the building will be completed by July 1st at the latest. This will make it possible to turn out 1,000 cars, including trucks, for the season of 1913.

Peacock Spoiled Electric's Finish.

If the story that comes from San Francisco is true, the next time W. M. Griffin gets a new car he either will make certain that its finish is not too highly polished or that his pet peacock is kept out of his garage. Had he put this rule in force earlier his car would look much better than it does now. According to the tale, when his new Grinnell electric arrived, Griffin ran it into the garage, to which building the peacock has access. The bird, which came in to inspect the premises, saw his reflection in the polished body and, true to his peacock nature, became jealous. When he spread his tail the reflected bird did likewise. Every crook of the gay head and every movement was imitated, whereat the peacock flew at the car and when he had finished battling with his enemy the side of it looked as if it had been polished with a curry comb.

Scale Formed by Annealing Processes.

When steel is annealed, or softened by the prolonged application of heat, a scale forms on the surface which is inimical to first-class hardening. Therefore annealed steel that is to be hardened should first have this scale removed. In the case of a bar, something like 5 per cent. of the diameter of the bar should be removed previous to the hardening process.

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1,007,333. Resilient Wheel for Vehicles. Courtland G. Capwell, Boston, Mass., assignor of thirty-seven one-hundredths to Fred Ruwitser, South Acton, Mass., and twenty-five one-hundredths to John H. Moore, Boston, Mass. Filed Dec. 23, 1909. Serial No. 534,569.

1. The combination, with an inner hub member at all times concentric with the axle, a plurality of rigidly connected and symmetrically disposed cylinders carried by said member, each cylinder having its longitudinal axis at right angles to a radius of the hub member centrally intersecting the cylinder, a pair of oppositely extended plungers longitudinally movable in each cylinder and projecting beyond the ends thereof, and springs to sustain and resist inward movement of the plungers, of a loosely surrounding outer hub member having within its circumference inwardly extended, flat abutments arranged in opposite pairs parallel to each other to receive between them a cylinder and to engage the outer ends of the plungers of such cylinder, and means independent of the abutments to limit relative rotative movement of said hub members.

1,007,392. Spring Wheel. Charles Scheuner, Chicago, Ill. Filed Oct. 19, 1910. Serial No. 587,962.

A spring wheel comprising a felly provided with an annular series of radial separated spring supports having inward offset straight transverse portions, an annular spring plate of straight form in cross section located upon said transverse portions and having marginal open end slots engaging said shoulders, an annular tread strip located upon said spring plate and having radial perforations, and radial bolts engaging said perforations and provided with hook ends engaging under said transverse portions.

1,007,394. Spare Tire Holder. Abram L. Shutter, West Haven, Conn. Filed Mar. 15, 1911. Serial No. 614,671.

1. A spare tire holder comprising a pair of yokes, locking mechanism arranged between the inner horns of the yokes, and a latch hinged to the outer horn of each yoke, the inner ends of the latches adapted to be engaged by said locking means.

1,007,479. Vehicle Spring. Frederick J. Nice, Pontiac, Mich. Filed Feb. 25, 1911. Serial No. 610,686.

1. In a vehicle spring, in combination with a wheel axle and a vehicle body, a pair of flat spring members located in supporting position with respect to said vehicle body, spring members yieldingly linking the ends of said flat spring members to one another, a pair of arched spring members attached to said axle and yoked to the central portion of said flat spring members respectively, and slotted anchorage means for the ends of said arched springs, whereby their position with respect to the varying conditions of strain and load imposed thereupon, substantially as described.

1,007,491. Internal Combustion Engine. Robert A. Reynolds, Detroit, Mich. Filed Mar. 15, 1909. Serial No. 483,347.

1. In an internal combustion engine, in combination with a cylinder, an oscillating valve pivoted eccentric to the axis of the cylinder and adapted to oscillate across the axis of said cylinder, and means for producing oscillation of said valve, substantially as described.

1,007,551. Automobile Fire Engine. Leonhard Fuchs, Rochester, N. Y. Filed Dec. 10, 1910. Serial No. 596,567.

1. In an automobile fire engine, the combination of suitable running gear having the usual propelling wheels; an engine mounted therein; a pump mechanism also mounted in the running gear; a driving shaft adapted to receive power from the engine; a clutch interposed between the driving shaft and the engine; a driven shaft; connections from the driven shaft to the propelling wheels of the running gear; a jack shaft; enmeshed gears on the jack shaft and the driving shaft; change gears on the jack shaft and on the driven shaft adapted to be moved selectively into driving relation with each other to produce different speed relations between their respective shafts; a pump-actuating mechanism; a clutch adapted to connect the pump actuating mechanism and the jack shaft; and a selective shifting mechanism for alternately operating the last mentioned clutch or moving the gears upon the driven shaft into and out of driving relation.

1,007,608. Safety Cranking Attachment for Internal Combustion Engines. George W. Sage, San Diego, Cal. Filed June 12, 1911. Serial No. 632.598.

The combination with the shaft of an internal combustion engine, of a ratchet wheel fixed thereon, a ratchet wheel loosely mounted thereon, the last named ratchet wheel being slightly larger than the first named ratchet wheel, a pawl engaging the loosely mounted ratchet wheel for preventing reverse movement thereof, an operating member loosely mounted to turn between said ratchet wheels, and a pawl pivotally carried by said operating member, of such width as to engage both of said ratchet wheels, initial reverse movement of the fixed ratchet wheel carrying the operating member and its pawl rearwardly until said pawl is lifted out of engagement with the teeth of the first named ratchet wheel by riding up one of the teeth of the loosely mounted ratchet wheel.

1,007,615. Vehicle Wheel. Franklin M. Tatum, Tenaha, Tex., assignor of three-fourths to J. P. Clevenger, Nacogdoches, Tex., and one-fourth to D. B. Woods and H. E. Norris, Shelby County, Tex. Filed May 25, 1909. Serial No. 498,292.

1. In a device of the character described, the combination of the spindle portion of an axle provided with a sharp edged extension, a vehicle wheel on said spindle, a locking nut, and packing material held within said wheel by said nut and pressd by said nut against said sharp edged extension, substantially as described.

1,007,640. Tire Tool. James L. Butler, Akron, Ohio, assignor to The American Tire & Rubber Company, Akron, Ohio, a Corporation. Filed Apr. 3, 1911. Serial No. 618,677.

1. A tool for compressing and attaching wheel tires comprising a main lever and an auxiliary lever pivoted thereon and having a guiding jaw, and chains adapted to be drawn about the tire and operatively engaged at their ends with the said main lever.

1,007,645. Automobile Running Gear. De Witt C. Cookingham and John H. Hertner, Cleveland, Ohio, assignors to The Rauch and Lang Carriage Company, Cleveland, Ohio, a Corporation of Ohio. Filed Nov. 30, 1910. Serial No. 594,981.

1. In a vehicle, the combination of the vehicle frame; a wheel axle; a housing for such axle; an elliptic spring supporting said frame upon said housing; and a member connected with said housing and with said frame at a point spaced from the point of attachment of said spring to said frame, one end of said spring being also connected to said member.

1,007,654. Cranking Device for Automobiles and Other Machinery. Edward A. Feiring, Plainfield, N. J. Filed Nov. 18, 1910. Serial No. 593,033.

1. In a starting mechanism, a crank shaft, a crank loose on the shaft, a sleeve also loose on the shaft, said crank carrying a yieldable detent device in part adapted to bear upon the periphery of the shaft and in part adapted to bear upon the periphery of the sleeve, a shoulder on the shaft and a shoulder on the sleeve, each of said shoulders being adapted to be engaged by said detent device when the crank is turned in the proper direction to drive the shaft, and the sleeve being free to turn in said direction with the crank, said sleeve having also means for lifting said detent device out of engagement with the shoulder on the shaft when the crank is turned relatively to the sleeve in the other direction, and means for locking the sleeve against movement when the shaft reverses its drive and turns in such other direction.

1,007,659. Carburetter. Merrill B. Rice, Los Angeles, Cal., assignor of one-half to George Morgan, Los Angeles, Cal. Filed Oct. 25, 1910. Serial No. 589,047.

1. A carburetter comprising a casing formed with inlet and outlet portions and with an intermediate enlargement, an oil supply connection extending into the casing and provided with a valve seat and with a fixed spreader member, said spreader member extending transversely within the said enlargement in the casing, a valve member co-operating with said valve seat, a movable spreader member connected to said valve member and extending parallel to and co-operating with said fixed spreader member to form an annular outlet between said members, and means extending from said outlet portion of the casing into proximity to the said movable spreader member to form an annular passage between said means and said movable spreader member, whereby the deficiency of pressure in the outlet portion of the casing as compared with the pressure in the inlet portion of the casing tends to move the movable spreader member to open the valve.

1,007,671. Safety Signal for Vehicles. George F. Buente, New York, N. Y., and Henry C. Fling, Spring Lake, N. J. Filed Feb. 11, 1909. Serial No. 477,377.

1. In safety signals for vehicles, three electric tail lights arranged adjacent to and intermediate the opposite sides of the vehicle, an electric battery, normally open circuits between said battery and said lights respectively, a circuit closer consisting of a plurality of contacts adjacent to the steering gear and a contact carried thereby adapted to engage either of said other contacts whereby said side lights may be set individually to indicate a change of course of the vehicle, and circuit closers adapted to be actuated by the reverse lever and the brake lever respectively, whereby the circuits to said lights may be closed to set

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them in different groups to indicate the stoppage or reversal of the vehicle.

1,007,688. Lamp Controlling Device for Motor Cars. Warren A. Greenlaw, Melrose, Mass. Filed Jan. 3, 1911. Serial No. 600,834.

1. In a device of the class described, the combination of a lamp casing; a reflector therein; a pivoted support therefor; a burner movable with said support; a rocker member; a connector between said rocker member and pivoted support; a pendant actuating member connected to said rocker member; and an arm secured to the steering rod adapted to operate said actuating member in its movement in one direction and thereby move said reflector support about its pivot to project its rays in the direction of movement of the car on which said lamp is mounted.

1,007,728. Vehicle Wheel. John H. Phillips, McKees Rocks, Pa., assignor of one-half to John H. Phillips, Jr., McKees Rocks, Pa. Filed Aug. 12, 1910. Serial No. 576,890.

1. In a wheel, the combination of an outer rim and an inner rim movable radially with reference to each other, links connected in pairs to said rims, said links being normally in alignment with each other and at right angles to a line extending radially from said wheel, one link of a pair connected to the outer rim, the other link connected to the inner rim, the free ends of said links having abutments, and a spring encircling said links and engaging said abutments.

1,007,778. Automobile Tire. De Forest L. Gates, Salamanca, N. Y. Filed Feb. 3, 1910. Serial No. 541,667.

1. A device of the class described comprising a wheel-encircling band provided with spaced outstanding lugs; a tire spaced from the band and having openings to receive the lugs; a plurality of removable bearing strips each of sufficient length to fit between adjacent lugs and held against movement circumferentially of the wheel; and springs secured to each strip transversely thereof and constituting a means for yieldingly supporting the tire.



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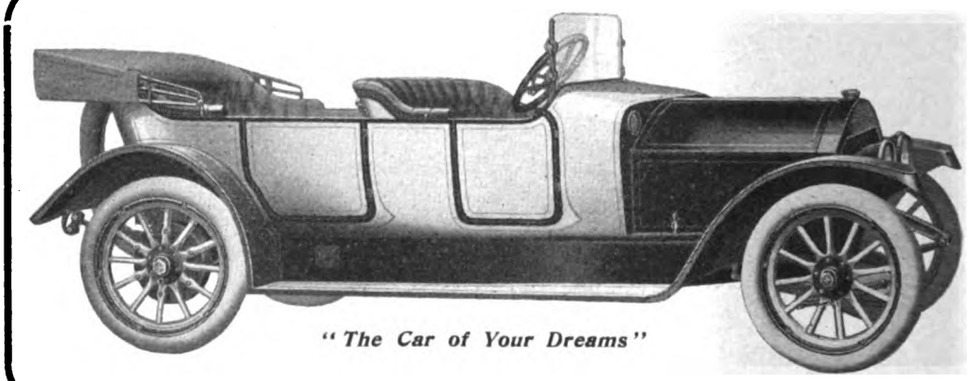
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As a dealer you have often said to yourself: "If I were building a car I would have all the latest proven advantages, as well as some things that no manufacturer has ever thought of. I would have a luxury-equipment that would make driving a real pleasure.

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"I would have a Gasoline Gauge on the dash, so that I would never be caught short of gasoline. A Gasoline Tank so situated as to give fuel at all times on the steepest grades. I would also have Demountable Rims, so that the tire changes would never hold me up or bother me.

"I would have Electric Lights with a Dynamo System, and not be compelled to rely on batteries that are liable to give out at any time. I would have a dependable Starter—and above all, I would have my car so arranged that from the driver's seat, by the mere pressure of buttons, I could start my Motor, light my Lamps and make a Comfortable Get-away with the utmost ease and no fussing."

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—Five Passenger $1385

Read These Specifications

The Hendersons of Indianapolis now offer you a real Self-Starting, Five-Passenger Touring Car, with Luxury-equipment, for $1385—116-inch Wheel Base—Ward Leonard Dynamo Electric Lighting System — 34x4 Tires, Demountable Rims — Long Stroke 4 1/8x5 1/4 Silent Motor, with 3-point suspension—famous Stutz Rear Axle Transmission—silent Gears—left hand drive—Single Lever Center Control—Gasoline Tank under cowl of dash, Gasoline Gauge on dash—Nickel mountings throughout.

Advertised in 125 leading newspapers

The "Henderson" will take rank immediately with the best advertised cars—the demand is being created by running a series of attractive advertisements in all the leading newspapers—and best of all, here at last is a car that will sell **on sight** and **stay sold.** We are now open for exclusive connections with live, red-blooded dealers who desire to get a strangle-hold on the automobile sales in their territory.

Dynamo Electric Lighting System

At least investigate—don't decide now—but remember while you are hesitating—while you are considering the matter, some dealer in your city may apply for the exclusive sale of the "Henderson" and you will be **too late.** As a dealer you are now face to face with the biggest opportunity you will ever be offered to sell a car with which you can surely meet, beat and defeat any and all price competition.

The Hendersons of Indianapolis vouch for every claim made here—you know their high reputations in the past—and by applying for the exclusive agency of the "Henderson" now you will sell more cars and make more money in the next six months than you have in the last two years. The "Henderson" is in reply to the persistent demand for a Luxury equipment automobile that will make driving a real pleasure—and can be sold at a reasonable popular price. Just sell one or two "Hendersons" to your trade and the trick is done—every one sold means orders for **more.** Don't delay—don't put this matter off—it is too important. Take the first step to-day towards building up a permanent profitable business. Wire quick or send coupon below by return mail.

New models of the "Henderson" will be ready for your inspection during the week of the 500-mile race at the Indianapolis Motor Speedway, May 30.

Henderson Motor Car Company
of Indianapolis, U. S. A.

Mail This Coupon TODAY!

Henderson Motor Car Co. (E)
Of Indianapolis, U. S. A.

Without any obligation on my part, send me at once Advance Proof Sheets of your book, "Your Dreams Come True," also your "Henderson" Car Exclusive Agency proposition to Dealers, with prices and terms. I have been selling the

..... car.

Name .....

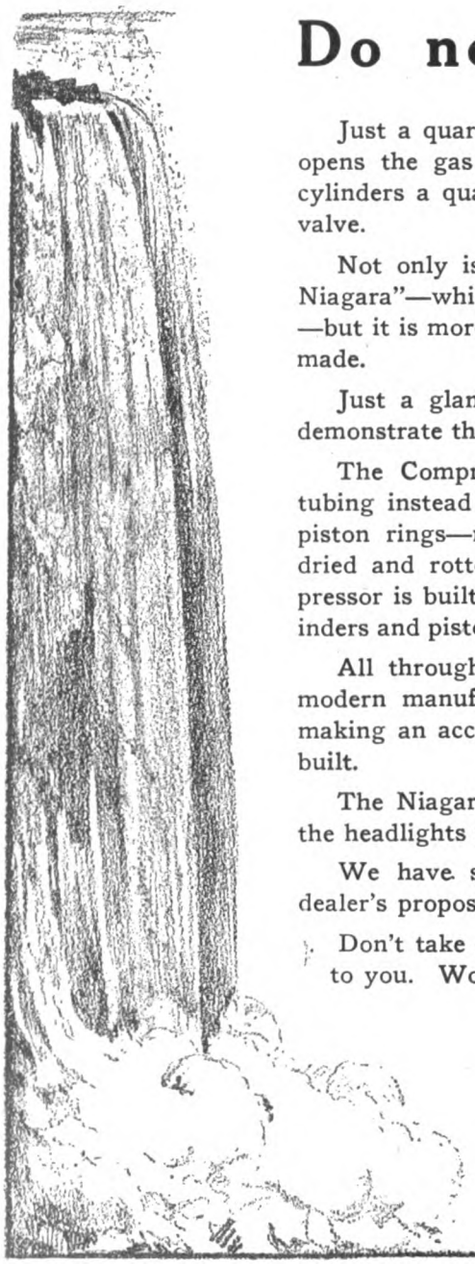
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The Niagara Self-Starter

is a practical starter



Do not be skeptical

Just a quarter turn of the handle of the compressor opens the gas valve. As you force the gas into the cylinders a quarter turn back, of the handle, closes the valve.

Not only is the Niagara Starter "as dependable as Niagara"—which means it starts your motor every time—but it is more substantial and simpler than any starter made.

Just a glance at the diagram shown herewith will demonstrate the truth of these statements.

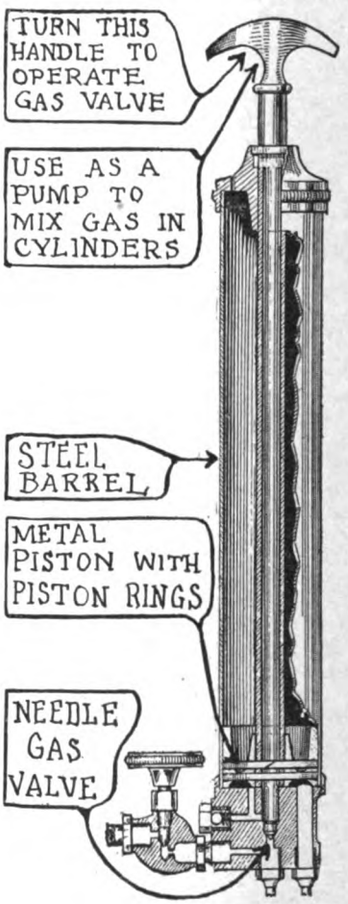
The Compressor barrel is made of seamless steel tubing instead of soft brass. The piston is fitted with piston rings—not with leather washers that are soon dried and rotted by acetylene gas. In fact, the compressor is built as strongly and substantially as the cylinders and pistons of your engine.

All through the construction is the best known to modern manufacturing practice with the idea only of making an accessory not out of place on the finest car built.

The Niagara Starter also admits of the adjusting of the headlights from the seat of the car.

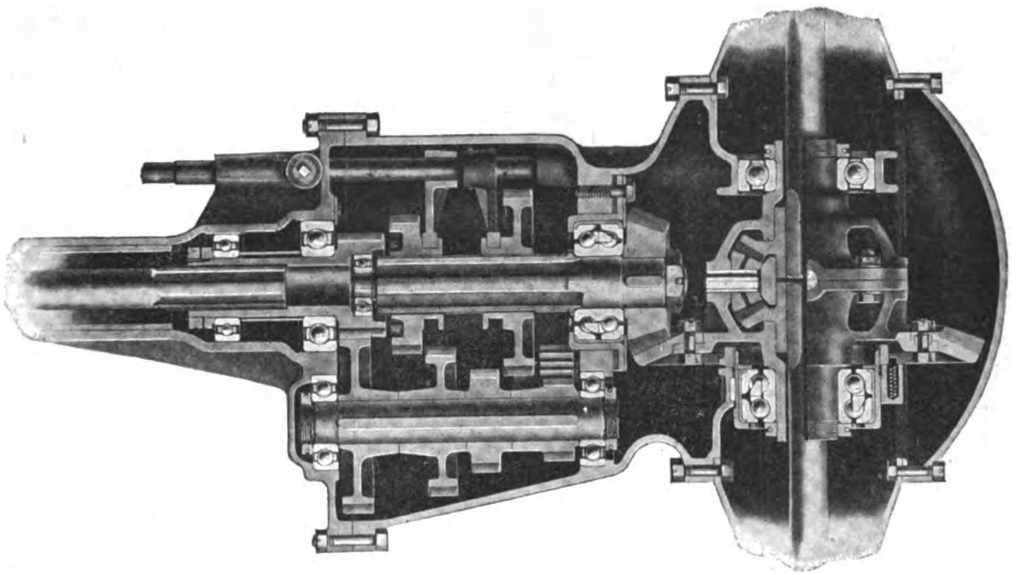
We have some good open territory and the best dealer's proposition yet offered.

Don't take our word for this—just make us prove it to you. Won't you let us quote you our discounts?



THE NIAGARA SALES COMPANY
704 Main Street **BUFFALO, N. Y.**

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American Made FOR American Trade

New Departure GUARANTEED Ball Bearings

In Sixty Per Cent. of American Cars

SUPERIOR FOR THE TRANSMISSION: The success of New Departure Double Row ball bearings in resisting excessive radial loads and thrust stresses is demonstrated in the fact that this bearing is more commonly used than any other in the transmission back of the bevel pinion. It does away with the cumbersome thrust washer, complicated and expensive mounting and gives maximum efficiency and durability.

NUMEROUS ADVANTAGES IN THE DIFFERENTIAL: The use of the New Departure Double Row on the side of the differential insures simple, economical, ample provision for carrying the considerable thrust loads from the ring gear, fixes the working relation of the parts and prevents "slapping" of the gears. These are important advantages.

New Departure Single Row Ball Bearings are employed in the construction illustrated above, to care for radial loads only. This bearing has no superior, is absolutely guaranteed for strength of material, quality of workmanship and accuracy of finish.

CATALOG ON REQUEST—HIGHLY SPECIALIZED ENGINEERING INFORMATION ON YOUR BEARING PROBLEMS FOR THE ASKING

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.

Western Branch—1016-17 Ford Building, Detroit, Mich.

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Wants and For Sale

15 cents per line of seven words, cash with order. In capitals, 25 cents per line.

BARGAINS—1911 Krits; 1911 Hupmobiles; 1910 Hudsons; 1911 Paiges; 1912 Westcotts; 1911 Stoddard-Daytons; 1911 Wintons. L. H. PRESTCOTT, 33 Seldon Ave., Detroit, Mich.

LARGEST dealers in Texas. High grade used automobiles for business and pleasure, also supplies. What have you to offer. COMMERCIAL AUTO & REPAIR CO., San Antonio, Tex.

WANTED—An experienced Superintendent for Automobile Wheel Factory, building both pleasure car and heavy truck wheels. In replying state age, experience and references. SHORTSVILLE WHEEL CO., Shortsville, N. Y.

AUTOMOBILE POLISH and Cleaner—Polishes, cleans and renews all wood, iron and leather finish like new. Get our ONE QUART FREE triat offer and money back proposition. Agents wanted. THE OAKRA CO., South Bend, Ind.

FOR SALE—High power Babcock Victoria Electric Runabout. RAYMOND TULLIS, 17 Battery Pl., New York City. Tel., 3990 Rector.

AUTOMOBILES—A. C. C. A. Prices Talk! Every make. Every model. Hundreds runabouts, racy roadsters, five-seven passenger touring cars. $50 up. Guaranteed five years. Shipped Freight Prepaid! Write today for the largest Illustrated Catalog published! THE AUTO MOBILE AND CYCLE COMPANY OF AMERICA, Dept. I-N, 1769-1787 Broadway, New York City.

MANUFACTURER of well known high grade automobile, about to place motor trucks on market, has opening for several engineer-salesmen competent to take charge of truck departments at its branches as business develops. Experience in motor trucks not essential, but must have good mechanical knowledge and selling ability. Exceptional opportunity for men of proper caliber. State experience, reference, salary desired, age, married or single. Address R. S., care Motor World.

MAILING LISTS—Names of registered auto owners of any State, $1.50 per 1,000. S. H. CARROLL, JR., Albany, N. Y.

DELIVERY Wagons and Trucks; genuine bargains. Six months' guarantee on commercial vehicles, whether it is the baker, butcher, grocer, laundry or any other business; whether you want to carry up to 1,000 pounds or 10,000 pounds; our study for the past seven years of commercial cars places us in position to give you the right car at the right price; we have light delivery wagons and trucks from $200 up. AUTO TRADE CO., 509-511 7th Ave., New York.

ROCHET-SCHNEIDER, 1907; first class condition; just overhauled; Bosch high tension magneto; new 5 passenger body; would sell chassis singly; bargain. C. H. PECKWORTH, 631 Hudson St., New York.

SALESMEN who are calling on automobile trade. AMERICAN ASBESTOS COMPANY, Norristown, Pa.

GARFORD 1910, 35 H. P., 4 Cyl., 4 passenger, complete equipment, windshield, Klaxon, Prest-O tank, 2 spare shoes, shock absorbers, Dorian rims, new top, and just painted and overhauled. Take cash and smaller car or will sell on easy terms. ROGERS, 4144 Park Ave., Bronx, N. Y.

TOURISTS, does your auto need a bath? Try us. AUTO BATH GARAGE, 70 South St., Rochester, N. Y.

FOR SALE—240 acres good improved Geary Co., Kan., farm; price $50 per acre; will take good touring car in part payment. A. A. JAECKE, Herington, Kan.

AGENTS WANTED — To handle the $1000 G. J. G. "Junior," racy, classy and specially designed chaseabout with 104-inch wheelbase, with a real 26 H. P. motor, Bosch magneto, Dorian remountable rims with 32 x 3½ tires, at a price of $1,000, which is a money-maker for the sales agent. Write for literature and discounts to G. J. G. MOTOR CAR COMPANY, White Plains, N. Y.

A VALUABLE BUSINESS FOR SALE—The Denniston Company, Buffalo, N. Y., engaged in making of the Denniston Commercial Car, and the making of fine bodies, and refinishing of automobiles, is for sale as a whole, or the Commercial Car business will be sold independent of the balance. The business is conducted in a building unusually well equipped for carrying on the business, and the opportunity is worth investigating. Please communicate with E. J. BARCALO, Receiver, The Denniston Company, Buffalo, N. Y.

FOUR CYLINDER TIRE PUMP and Accessories. Dealers write for agency. PEERLESS ACCESSORIES MFRS., 1926 Wabash Ave., Chicago.

GARAGES—Portable-permanent, steel or wood. KNAPP SYSTEM, 123 Liberty St., New York.

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NEUSTADT'S 1912 200-page Automobile and Motor Boat Accessory Catalogue, free for the asking. NEUSTADT AUTOMOBILE & SUPPLY CO., 3200-2-4 Locust St., St. Louis, Mo.

MANUFACTURERS of Automobile Accessories—We propose opening a first-class supply store on June 1. Please submit proposition of whatever you have to offer us on a consignment basis. REO SALES AGENCY, Charleston, W. Va.

AUTOMOBILES cost too much; save $50 to $500 selling to yourself. Brand new, fully guaranteed 1912 cars, any model, any make, at liberal discounts. Referenced agent wanted every town. UNION MOTOR SALES CO., 3127 C. P. A. Bldg., Dayton, Ohio.

FOR SALE—Coupes for immediate delivery. Stylish, up-to-date and well constructed. Fit almost any car. Write us. ROBBINS & CO., Indianapolis, Ind.

AUTOMOBILE MAILING LISTS—We can furnish 472,000 Automobile Owners, segregated by States, $2.00 per thousand. Also Dealers, Garages, Repair Men, Manufacturers, etc. Ask for our "Silent Salesman" No. 52, showing 2,000 other classified lists. It's free. TRADE CIRCULAR ADDRESSING CO., 166½ W. Adams St., Chicago. 'Phone, Franklin 1182. Established 1880.

HAVE A NEW AUTOMOBILE!—For $2.10 you can refinish your entire car with Transparol. Money back if not satisfactory. Used by the leading garages. AM. TRANSPAROL CO., 50 Church St., New York City.

DEALERS—Get agency proposition for Cutting Cars. Write for information to CUTTING MOTOR SALES CO. OF CANADA, 76 Adelaide St., West, Toronto, Canada.

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PARCEL DELIVERY WAGON—Cadillac light delivery, late model, ready to give a year's service without spending any money; equipped with good tires; sacrifice at $325. BARNET, 509 7th Ave., New York City.

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MAILING LISTS of automobile owners in Atlanta and several States. 303 Kiser Bldg., Atlanta, Ga.

BARGAINS in new 4 x 5 4-cylinder auto motors. Equipped. F. E. ALFORD, Goshen, Ind.

WANTED—Ardsley touring car; state price and condition. C. H. CURTISS, Naugatuck, Conn.

BROKEN CYLINDERS, crankcases, etc., made good as new by welding at about ¼ cost of new parts. No charge unless weld is satisfactory. Write for references and complete information. WATERBURY WELDING CO., Waterbury, Conn.

MAGNETOS—An Unusual Offer. We have just secured 200 (only) brand new Remy Magnetos with coils which we are offering as leader at $18.50. Be quick; they won't last long. THE AUTO PARTS MFG. CO., Detroit, Mich.

BROKEN CRANKSHAFTS, cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

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SCORED CYLINDERS repaired, $12 each. No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. Better investigate and save money. References, testimonials, and full details on request. WATERBURY WELDING CO., Waterbury, Conn.

SALESMEN, one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. STURDY MFG. CO., 2637 Michigan Ave., Chicago, Ill.

GAS ENGINE Troubles and Installation, cloth, $1.00; flexible leather, $1.50. Automobile Troubles and How to Remedy Them, cloth, $1.00; leather, $1.50. Eight other practical and reliable mechanical books. Send for circular. CHAS. C. THOMPSON CO., Dept. B, 1126 S. Wabash Ave., Chicago.

FOR SALE—Mitchell Six—Cutting Forty. For information, address OWNER, 119 Railroad Ave., Carnegie, Pa.

WANTED—First class man thoroughly posted on Automobile Sundries—one competent to manage Sundry Department for large firm. Give reference, age and salary wanted, and past experience, which will be treated confidential. Address OMAHA RUBBER COMPANY, Omaha, Neb.

WANT a Stanley steamer, model 60, any condition. F. L. RICH, 3 George St., Roxbury, Mass.

HAVE YOU TRIED the new cotter pin tool; no more skinning of hands; 15 tools in one, at $1.00. For sale by E. M. WORDEN, Ladysmith, Wis.

ARE YOU in need of any additional help in any department of your business? Are you out of employment or looking for a better connection? Have you second-hand apparatus of any kind or do you want to buy second-hand material? Have you a factory site for sale or do you want to buy one? If so, use the Want and For Sale column of the Motor World. Seven words to the line, fifteen cents a line. Advertisements can be inserted over a number when it is desired and identity of the advertiser will be kept confidential.

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For Motor Trucks
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Mosler Spit-Fire Are The Best

$495.00 METZ 22 H. P. MOTOR CAR
The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "h" mailed free on request
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OF EVERY DESCRIPTION
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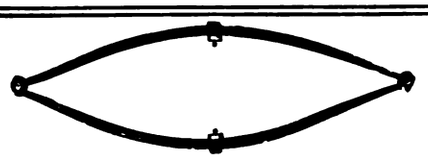
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TECHNICAL SERVICE for THOMAS OWNERS
E. R. THOMAS MOTOR CAR CO.
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Press the Lever and It's Tight
Simple, Isn't It?
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25c. at All Dealers or
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Perfection Spring Company
SPECIALISTS IN
Spring Suspension
High Grade Only
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Guaranteed Automobile Springs
Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.
PENN SPRING WORKS
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Weed Chains

The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you cannot prevent skidding or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with Weed Chains.

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them on the front wheels too.

For your own safety—for the safety of the public, fully equip your car with Weed Chains. Make it your business to get a set today.

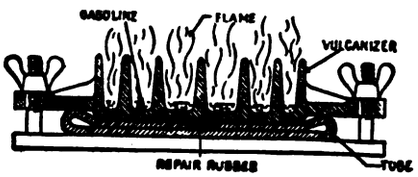
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Weed Chain Tire Grip Co.
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The Name "Weed" on Every Hook

Repairs the Inner Tube in 15 Minutes

SIMPLE — EASY — SURE



Patent Pending Nickel Plated

Price $3.50 Complete

At your dealers, or sent by express.

Guaranteed to Satisfy

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THE McGRAW TIRE & RUBBER CO.
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"CONTINENTAL"



Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders 20 to 60 H. P.

Write for Booklets

CONTINENTAL MOTOR MFG. COMPANY
Muskegon, Mich.

FACTORY REPRESENTATIVES;
K. F. Peterson, . 122 S. Michigan Blvd., Chicago
L. D. Bolton, ... 1810 Ford Bldg., Detroit

Locomobile Cars for 1912

Complete information furnished on request.

The Locomobile Company
BRIDGEPORT, CONN.

Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.

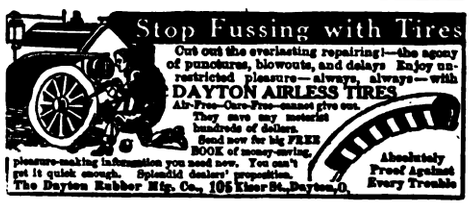
(38) R. M. OWEN & CO., General Sales Agents
REO MOTOR CAR CO., Lansing, Mich.

All Standard Bearings

are fully described in our
New Catalog 24 A
Send for it.
Standard Roller Bearing Company
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Woodworth Treads

will help you to increase your business while benefitting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
LEATHER TIRE GOODS CO., Niagara Falls, N. Y.



We Specialize on Finishing Crank Shafts Only.

MICHIGAN CRANK SHAFT CO.
Lansing

75% Increase in Tire Efficiency

That's what the INNERSHU accomplishes. It's a tough, durable, rubberized fabric formed permanently to tire shape. Ask for circular.

INNER SHOE TIRE COMPANY
Front Street Grand Rapids, Mich.



MOTZ Cushion Tires

For Pleasure Cars and Light Delivery Cars
Send for Booklet 58
THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

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Standard Tire & Rubber Co., 104-106 Portland St., Boston
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TRUFFAULT-HARTFORD Shock Absorber

HARTFORD SUSPENSION COMPANY, 184 Bay St., Jersey City, N. J.
EDW. V. HARTFORD, Pres.
New York, 212-214 W. 88th St.; Boston, 319 Columbus Ave.; Chicago, 1458 Michigan Ave.; Philadelphia, 250 North Broad St.; Detroit, 870 Woodward Ave.

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LOOK FOR THE LABEL
It's always on a good "MAZDA" Lamp
Federal Miniature Lamp Works
of the General Electric Co.
Chicago Cleveland

Aluminum Bodies

THE SPRINGFIELD TOP
(Pat. 1895)
SPRINGFIELD METAL BODY CO.
366 Birnie Avenue, Springfield, Mass.

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Twitchell Patents Snstained

In the Official Gazette of the United States Patent Office issued April 9, 1912, is printed the latest victory of the Twitchell Gauge Patent under the following heading:

SUPREME COURT OF THE DISTRICT OF COLUMBIA

Twitchell v. Rudolph & West Company
Decided October 26, 1912.

PATENTABILITY—INFRINGEMENT.

The patent to Twitchell, No. 927,298, held valid and infringed.

Suit in equity by Charles R. Twitchell against Rudolph & West Company for infringement of Patent No. 927,298, dated July 6, 1909, pressure gauge for pneumatic tires. On final hearing. Decree for plaintiff.

This is rendered by Hon. Chief Justice Clabaugh.

This is the fourth decision in favor of the Twitchell patent that has been rendered by the Courts to wit: the following suits were decided in our favor:

The Prest-O-Lite Co.
The Northam Manufacturing Co.
The New York Sporting Goods Co.
The Edelman Gauge.
The Rudolph & West Co.
The Safety Gauge.

We are printing these facts so that the jobbers and dealers of bicycle, motorcycle and automobile accessories principally, and all others who buy, sell or use Tire Pressure Gauges, may be fully informed as to the patent situation, and also hereby give notice that we will immediately begin to prosecute vigorously all infringements of our patent rights.

THE TWITCHELL GAUGE CO.
1256 Michigan Ave. Chicago, Ill.



Ask for Agency

Learn From the Book—Why the *Glide* is Best

If you are contemplating the purchase of an automobile you can make no mistake going to a "Glide" dealer. In the first place, a "Glide" dealer has a car that he can sell with absolute confidence and with the knowledge that the automobile will give

5 to 7 Years' Service

Then again he knows that his customer becomes the purchaser of a car that combines quality and price in a way that has never been equalled by any automobile manufacturer.

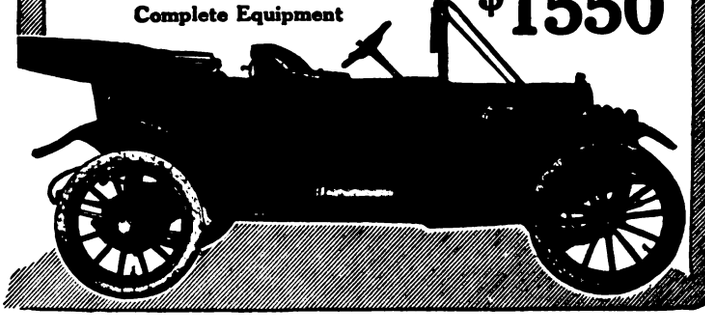
If these things count for anything—and they surely do—then the "Glide" has a perfect right to call itself the *best* car—and the best car is the car you want. You can learn all about the "Glide" and the *guarantee* back of it from the handsome book we send free to all those interested. Booklet pictures and describes full line including Two and Four Passenger 45 h. p. cars, $2,000; Five Passenger "45" $2,150; Seven Passenger, "45" $2,250.

To Dealers: We intend to establish a few new selling agencies in territories which are still open. Write for our proposition. The "Glide" has made good for other dealers—it will make good for you. Write for information today.

THE BARTHOLOMEW COMPANY
220 Glide Street Peoria, Ill.

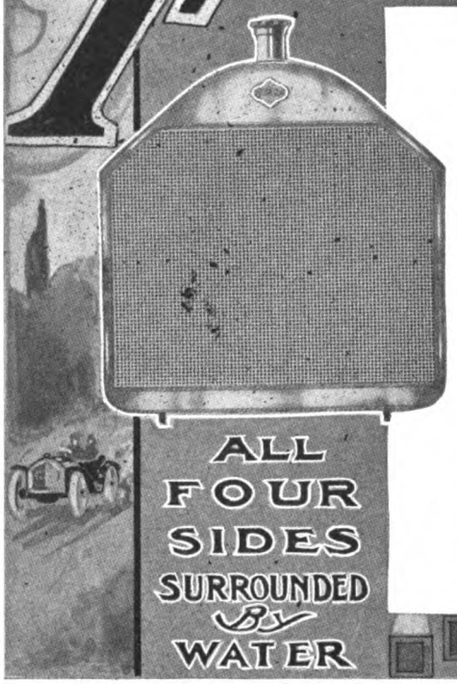
New Model, 36-42 H. P.
Complete Equipment

$1550



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Fedders SQUARE TUBE RADIATORS



Efficiency, service and economy are the chief characteristics of Fedders square tube radiators.

All four sides of each pure copper tube surrounded by water make a Fedders square tube radiator perfectly efficient in the performance of its cooling function.

The water space between the tubes being reasonably wide, there is little or no danger of a Fedders square tube radiator ever becoming clogged up—this means perfect service. It also means economical service for Fedders square tube radiators always cool their engines; that is, if the engines are normal.

Any tinsmith can repair a damaged Fedders square tube radiator at little or no cost. Most other radiators must be shipped to the radiator factory to be repaired. More Fedders economy.

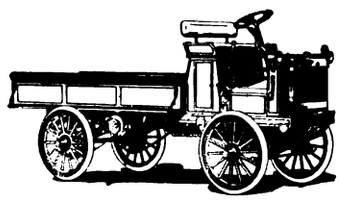
Wire us for more detailed information. While the square tube is our leader, we are in position to make almost any type radiator desired. Send us your blue prints and specifications and let us quote you.

FEDDERS MANUFACTURING WORKS, Buffalo, New York

Sanford

Motor Trucks are built by specialists in one ton truck construction

Chassis $1600



Stake or Express Body $1750

All the brains of our engineering department—all the skill of the mechanical department are concentrated in the product of a one ton truck only. And that means that we are better qualified to build the superior one ton truck than the plant that is turning out a variety of sizes and capacities. Sanford power plants are the unit power plant three point suspension type—water cooled—four cylinder—four cycle. All parts are readily accessible. The clutch and oiling system have no superior and few equals on power plants of any kind or price.

Exclusive territory on a good money making basis may be had by the right men in several choice spots. Don't wait for us to call—send for us—today—this minute.

The Sanford Motor Truck Co.
SYRACUSE, NEW YORK

Dependable Deliveries



DELIVERY dates are of utmost importance. Delay in shipments means loss of money.

We guarantee prompt deliveries.

Warner Quality and Warner eight-year old reputation for making highest class gears is back of the product.

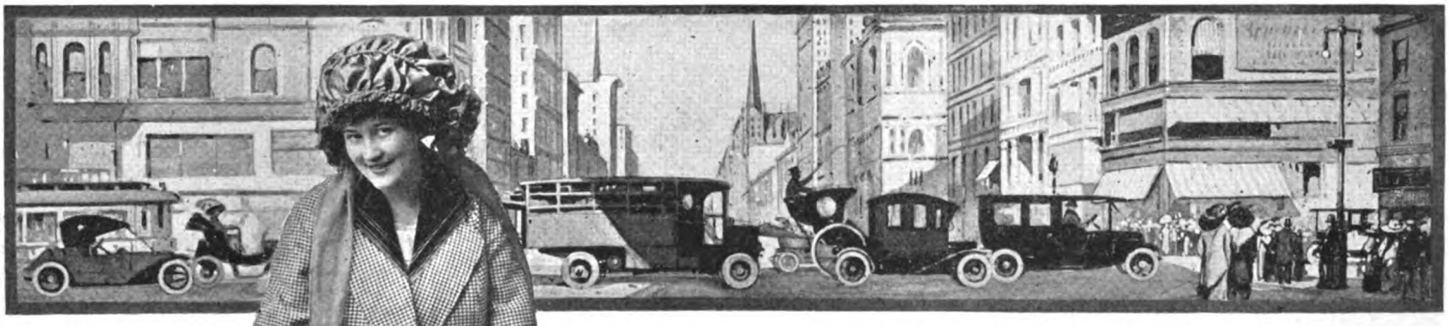
Car makers interested in the Quality and Merit that means absolute safety and satisfaction will do well to write.

We modify our designs to meet detail requirements, or build to approved designs on seasons quantity specifications.

Philadelphia, Glenwood Av. and 2nd St.
Detroit, 628 Ford Building

Warner Gear Co.
Muncie - Indiana

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Kelly-Springf ield Tire Company
20 Vesey St., New York

Branch Offices in
New York
Chicago
Philadelphia
Boston
St. Louis
Detroit
Cincinnati
San Francisco
Los Angeles
Cleveland
Baltimore
Washington
Seattle
Atlanta
Akron, O.
Buffalo

Boss Rubber Co. Denver, Colo.
Appel & Burwell Rubber & Tire Co. Dallas, Texas
Todd Rubber Company New Haven, Conn.

Second hand experience is just as efficient and infinitely cheaper than first hand.

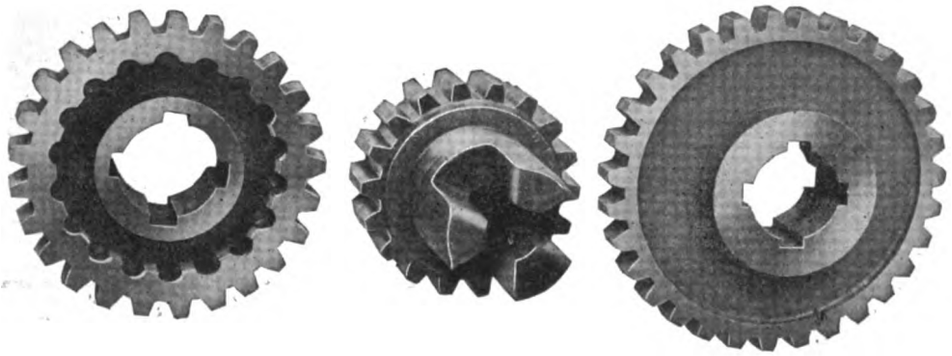
Take your tire experience from what others have learned at great expense on other tires, and get your tuition free. Get the **best** tires **first** by getting

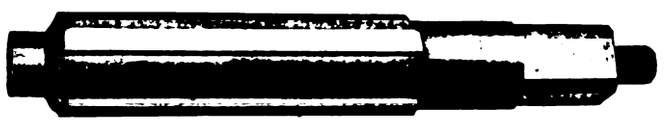
Kelly-Springfield Automobile Tires

The name "Kelly-Springfield" on a tire stands for the same quality of rubber compound, the same tire-making experience, and the same care in manufacture, that have, for sixteen years, made the Kelly-Springfield solid vehicle tire the best of its kind.

Kelly-Springfield Tire Company, New York and Akron, Ohio

GRANT-LEES GEARS

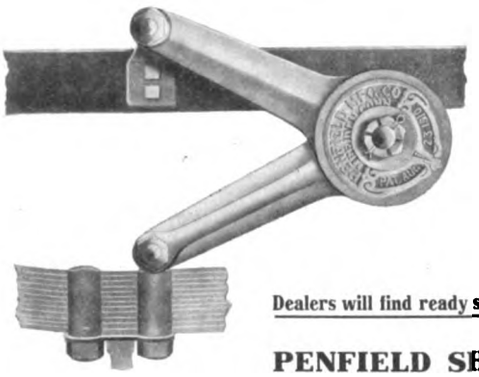




MR. CONSUMER—When buying gears consider
1st. Is the gear company's building concrete and fireproof?
2nd. Is the gear company's inspection department independent of production department?
3rd. Is the gear company's credit rating good?
4th. Is the gear company's capacity absolutely large enough to handle your orders?
MR. CONSUMER—Have you ever considered the importance of these facts?

THE GRANT-LEES MACHINE COMPANY, Cleveland, Ohio
Pioneer Helical Gear Makers in America

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The Penfield Shock Absorber

Compensating Spring, shown here as attached to car, operates through a triple circular coil, positively absorbs both shock and recoil—eases the springs under all conditions.

Saves riders, power plant, springs and tires, conducing comfort and preventing wear and tear.

Cannot Break — Needs No Adjusting — Has Absolutely No Wear

Dealers will find ready sale for this shock absorber.

Standard for cars over 3000 lbs., per set of four, $50.00.
For cars less than 3000 lbs., per set of four, $45.00.

PENFIELD SHOCK ABSORBER MFG. CO., 51 Randolph Ave., Meriden, Conn.

AJAX TIRES

(Guaranteed 5000 Miles)

Eliminate Half Your Automobile Troubles

As a matter of economy you cannot afford to run your car without taking advantage of our 5000 Mile Guarantee.

Thousands of enthusiastic, satisfied customers have found the greatest value in Ajax Tires.

They are chosen for their wearing qualities, their toughness and their special adaptability for hard road service.

DEALERS: Don't delay! Write today for our 1912 proposition.

AJAX-GRIEB RUBBER CO.
General Offices: 1796 Broadway, New York
Factories: Trenton, N. J.
Branches in Principal Cities

Great Northern Hotel

CHICAGO

Rates:
Without Private Bath
$1.50 and $2.00
With Bath
$2.50 to $4.00



Large Sample Rooms
Grill Room Popular Prices
Cafe on Parlor Floor

Jackson Blvd., Dearborn and Quincy Sts.

Most centrally located hotel in Chicago and absolutely of fireproof construction.

JOHN C. ROTH, Managing Director

The New Type of Electric

The Argo is setting new standards for builders of electric motor cars. Long and sweeping in lines—beautiful in finish—with luxury apparent in every detail, it attracts instant attention wherever it goes.

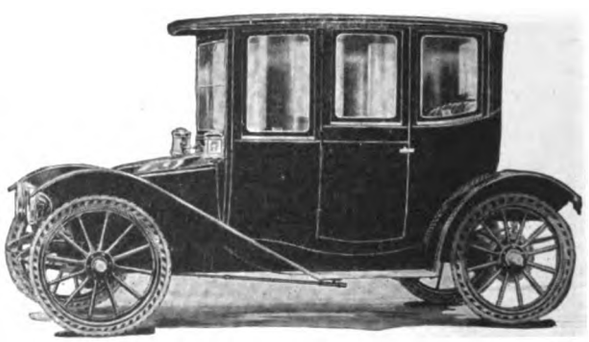
The Argo is different from the old style models—the body is not perched upon the chassis—it it swung low between the axles, with only 5 inches from curb to step. This low-hung construction gives not only the fine French lines, but low center of gravity. Swaying is impossible—skidding is reduced to a minimum—it is a radical departure from the old type of top-heavy, awkward, electric car.

ARGO ELECTRICS

The wheel steer of the Argo is handier—the only safe and sure steering method for rough and slippery roads—the silent, chainless, geared drive is more efficient—the long wheel base, large wheels and improved springs makes it ride easier than any other electric built.

AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both

ARGO ELECTRIC VEHICLE CO.
1201 S. Jefferson Avenue **SAGINAW, MICH.**
Chicago Salesrooms—2412 Michigan Avenue



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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

Diamond Tires

We could build them cheaper *But We Won't*

We would build them better *But We Can't*

ONE big advantage in favor of the dealer who sells Diamond Tires is this:

¶ Diamond Tires include any and every type and style of tire that car owners want, and every Diamond Tire sold builds prestige for all the others.

¶ Diamond Tires are made in all types to fit all styles or makes of rims. The Diamond types are Clincher, Quick Detachable, Mechanical (or Straight-side) and Fisk.

¶ In treads the Diamond dealer can offer the famous Diamond Safety Tread, the regular Smooth Tread, Bailey Tread and Grip Tread.

¶ Every type, every size, and four treads all included in one famous make of tires, and every tire no matter what the type or tread gives the greatest mileage and the best service that can be built into a tire.

¶ This is the Diamond dealer's advantage—can you beat it?

If you are not receiving our little magazine for dealers you're missing something good. Send your name—it's free to dealers.

The Diamond Rubber Company
Akron, Ohio

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BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY **DURABILITY**

One, Two and Three Ton Capacity

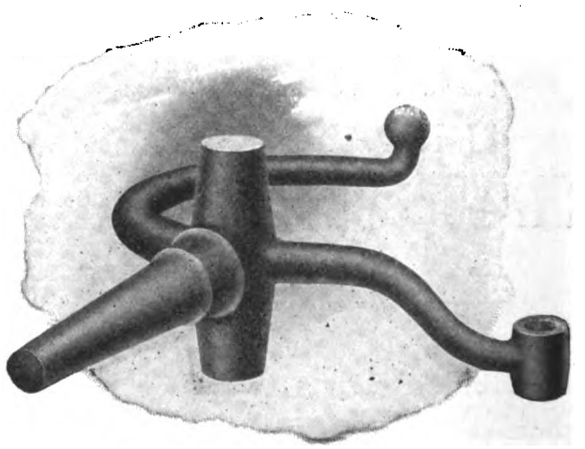
LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

Reliable Agents: Secure Your Territory for 1912 at Once.

THE LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

Branches and Agencies:

BOSTON—David Abrams, 131 Portland St.
NEW YORK—West Side Garage & Motor Co., 160-162 101st St.
CHICAGO—The Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
NEWARK, N. J.—Merchants Motor Car Co., Essex Building.
DETROIT, MICH.—Bierl Auto Truck Sales Agency, 453 Dix Ave.
DISTRICT OF COLUMBIA AND VICINITY—Bowles Motor Sales Co., Inc., 1608 14th St. N. W., Washington, D. C.



PIONEERS
in making and treating

Drop Hammer Forgings

We are equipped to produce the most intricate pieces from special analysis steel.

We are making parts for Peerless, Winton, Garford, Reo and others. An opportunity to figure on your present and future requirements solicited.

Prompt Service Guaranteed

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

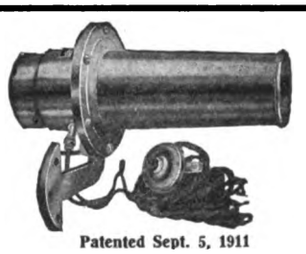
"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.



Patented Sept. 5, 1911

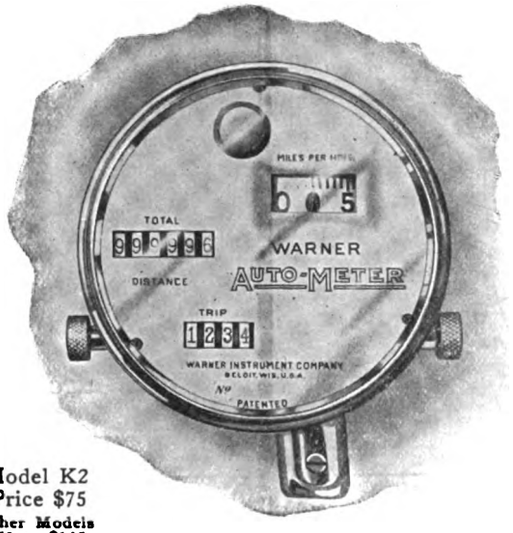
NEWTONE

The Mile-Away
MOTOR HORN
Torpedo Type

Once Hear It and You'll Want No Other
The Most Perfect Warning Signal
EFFICIENCY and ECONOMY
Price $20 Complete, Including Button and Cable

AUTOMOBILE SUPPLY MANUFACTURING COMPANY
220 Taaffe Place Near DeKalb Avenue BROOKLYN

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Model K2
Price $75
Other Models
$50 to $145

WARNER
AUTO-METER

"The Aristocrat of Speed Indicators"

CONSISTENT Auto Manufacturers are equipping with the Warner Autometer. How can a car be truthfully advertised as thoroughly good throughout when the speed indicator is known to be cheap and inferior?

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

Branches at

Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
Boston	Cincinnati	Detroit	Los Angeles	Pittsburgh	Seattle
Buffalo	Cleveland	Indianapolis	New York	Portland, Ore.	St. Louis

Of Course

BOSCH

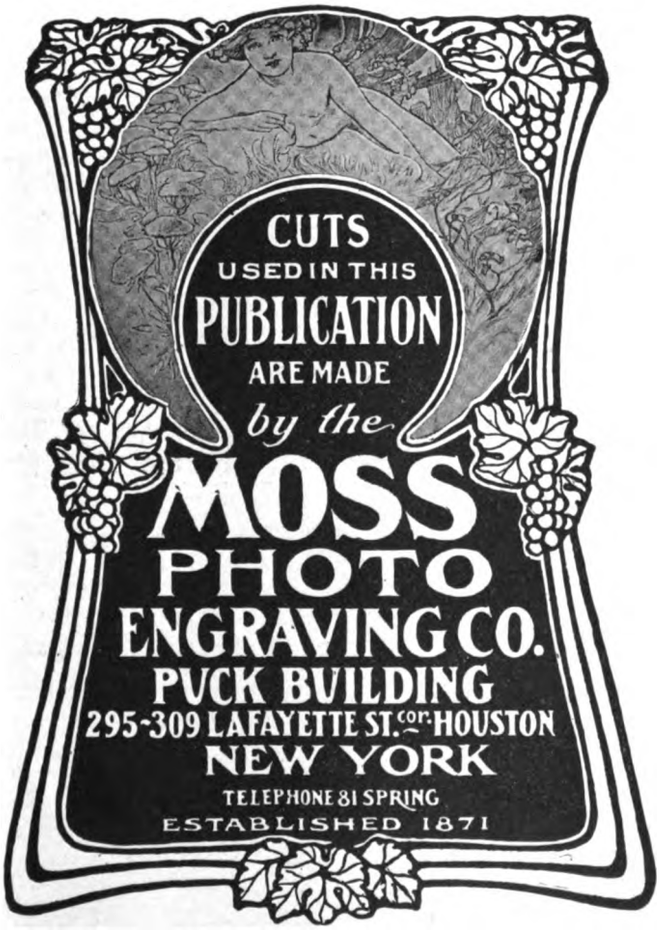
Wins

THE Fiat's new World's record of 78.5 m.p.h. average, is a Bosch record too—the Fiat and Benz that followed the winner likewise used the Bosch Magneto and Plugs, *of course.*

What is good for a million and a record breaker is good for you.

BOSCH MAGNETO COMPANY
223-225 West 46th Street, New York

Chicago Detroit San Francisco Toronto



The Hotel of Comfort

The WOODSTOCK

"You can walk from there to anywhere"

Our new addition is ready for occupancy.
We now have 360 rooms with 265 baths.
Write us for descriptive folder with typical floor plan and rate card.
Wire for reservation at our expense.

RATES

Court room with bath, for one, per day.....$2.50
Court room with bath, for two, per day..... 3.50
Outside room with bath for one, per day..... 3.00
Outside room with bath, for two, per day..... 4.00
Outside room with twin beds, for two, per day $4.00



HOTEL WOODSTOCK
127 W. 43d St.
New York
W. H. Valiquette, Manager.

Also
"THE BERWICK"
Rutland, Vermont

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Self HANNA Starter

The superior of any self starter ever dreamed of. The only 100 per cent. efficient self starter on the market that will not soot and foul your plugs.

The one self starter that scientifically and accurately measures your acetylene gas and then mixes it with air in your cylinders. Price $35.

J. H. VALENTINE COMPANY, Syracuse, New York

The Valentine Manifold Starter and Gas Lighter is the equal of any manifold self starter on the market. None so simple. None so practical. And none so low priced.

The electric gas lighter alone is worth the cost of both. Most lighters on the market sell for more than the Valentine starter and Lighter combined.

$10 The Valentine MANIFOLD STARTER and Gas Lighter

"Firestone" Tires and Rims



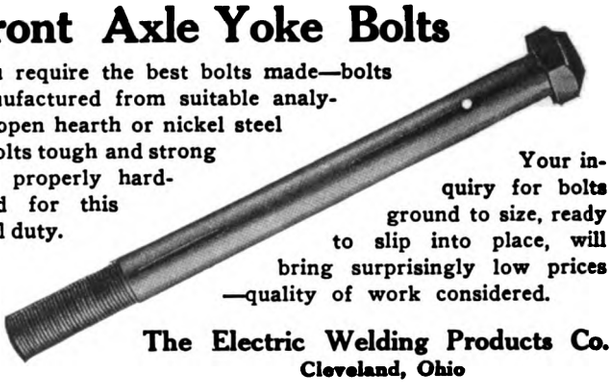


are the least likely to require changing, and afford the best means of tire changing when required.

The Firestone Tire & Rubber Co., Akron, Ohio
and All Principal Cities

Front Axle Yoke Bolts

You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel—bolts tough and strong and properly hardened for this vital duty.



Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

The Electric Welding Products Co.
Cleveland, Ohio

DUPLEX EXTERNAL BRAKES

Act Instantly—Forward or Backward

Duplex brakes produce maximum safety. They are America's leading brakes. Made by brake experts. Nothing so necessary as "quick acting" brakes.

Get a set of DUPLEX brakes. Inexpensive—easily installed. We build brakes to order. Write us today. Let us quote prices. Send for complete catalog.



THE ROYAL EQUIPMENT COMPANY
436 Housatonic Ave. Bridgeport, Conn.
Manufacturers of Raymond Brakes, Raybestos Brake Lining and Gyrex—The Mixer.

United States Tires



ARE GOOD TIRES

Price $20
Without Cylinder Attachments

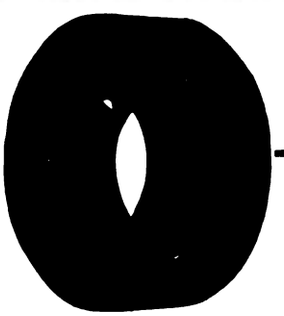
"The Crankless" STARTER

By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.

Guaranteed by our 40 years standing and reputation.

COX BRASS MFG. CO. Established 1872 **Albany, New York**

Eliminate Noise in Your Car



Use Hyatt Roller Bearings





Hyatt Roller Bearing Co.
Detroit, Michigan

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Empire Twenty-Five

The Little Aristocrat

This is the Big Brother of the Famous Empire Roadster and is a small edition of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.
224 Massachusetts Street — Indianapolis, U. S. A.

WINTON SIX

Highest Merit : Lowest Price

The $3000 Winton Six has no competition below $4000 and no superior at any price. Find, if you can, in cars selling above $3000, any actual car-quality equivalent to the added price. Our booklet, "Let's Count the Cost," is an eyeopener. Shall we send you a copy?

THE WINTON MOTOR CAR CO.
426 Berea Road — Cleveland, O.
World's First Maker of Sixes Exclusively

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

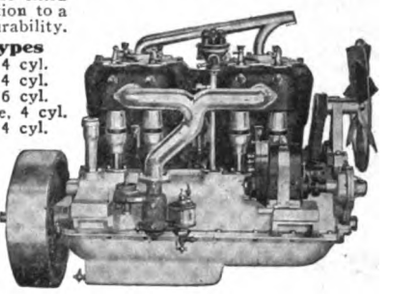
PULLMAN MOTOR CAR COMPANY
222 N. George Street — YORK, PA.

Wisconsin — The Consistent Motors

The crank shaft is of large diameter—a self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. The extra large bearings reduce friction to a minimum and increase durability.

All 4 Cycle—in 5 Types

3¾ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 6 cyl.
4¾ in. bore, 5½ in. stroke, 4 cyl.
5¼ in. bore, 7 in. stroke, 4 cyl.



WISCONSIN MOTOR MFG. CO.
Dept. 32
Milwaukee
Wis.

Hupmobile

Long-Stroke "32" Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

20 H. P. Models

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Electric headlights, electric and oil side and tail lamps, folding dash seat for third person. Rear tires, 31 x 3½ inches. With 110 inch wheelbase, $1150.

HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

TRUCK FRAMES

Automobile Frames and Special Stampings

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

National 40

Stock Champion



Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY
1007 E. 22nd Street — Indianapolis, Ind.

"Invincible" TRADE MARK STARTER

THE VALUE OF SIMPLICITY

Price $25

Simplicity of construction accounts for the *low* cost and *high* efficiency of the INVINCIBLE STARTER. Because it can be made for less than other *high class* starters, it can be sold for less. Because it is *not* complicated, it is as safe as it is trouble-proof. Its parts are so few, its operation so direct, that it can't get out of order. Anyone can understand an INVINCIBLE, anyone can operate it. It operates on a properly proportioned mixture of acetylene gas and air. Press the button, turn on the switch—the motor starts. Costs less than 1/25 of a cent per start. Used as standard equipment by the U. S. Motor Co. The best starter for the motorist—the best for the dealer. Write for our generous agency proposition.

The Invincible Starter Co., 744 Penobscot Bldg., Detroit, Michigan

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ANNOUNCEMENT

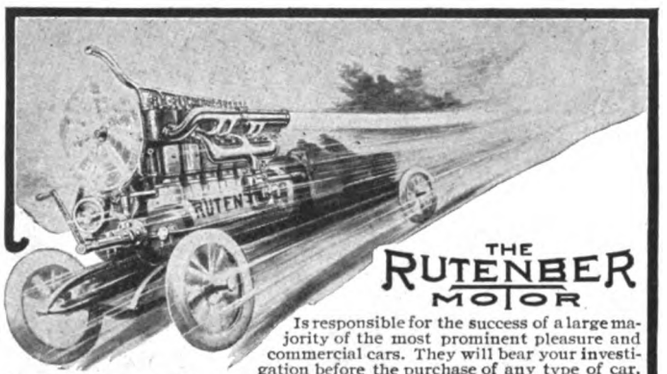
Pleasure Cars - 7 Models
Delivery Cars } - 4 Models
Trucks
} $850 to $3500

Now Closing 1912 Contracts

PETREL MOTOR CAR COMPANY
2530 First Avenue Milwaukee, Wis.

Ford
THE UNIVERSAL CAR

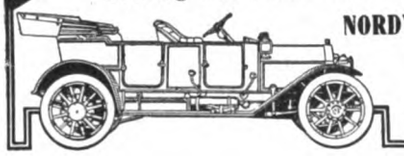
Its lightest—rightest—most economical—that's the reason we'll make seventy-five thousand of them this year. Prices $590 to $900. Agencies everywhere.
Ford Motor Company Detroit, Mich.



THE RUTENBER MOTOR
Is responsible for the success of a large majority of the most prominent pleasure and commercial cars. They will bear your investigation before the purchase of any type of car. Literature upon request.
THE WESTERN MOTOR CO., Marion, Indiana

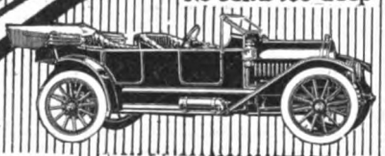
Large photogravure of the above cut for framing 14c in stamps.

The Easiest Riding Car in the World
MARMON
INTERNATIONAL CHAMPION
A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



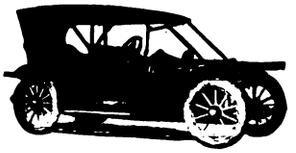
NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

Jackson
No hill too steep
No sand too deep



MODEL 52 $1800
" 45 $1650
" 32 $1100
" 26 $1100
" 28 $1000

JACKSON AUTOMOBILE CO.
1204 E. Main Street
JACKSON, MICHIGAN



The American Underslung

WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

American Motors Co., Dept. E, Indianapolis, Ind.

Stearns
THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta Minneapolis and San Francisco

Cartercar



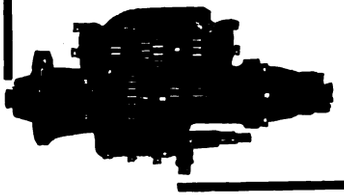
Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.
CARTERCAR COMPANY, Pontiac, Michigan

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COVERT Transmissions

for commercial cars have always proven successful.

They will stand the severest tests and all we ask of you is to let us demonstrate this fact on your own car. Your inquiries will be given every consideration.



COVERT MOTOR VEHICLE COMPANY

Sales Offices:
Ford Building, Detroit, Mich.

Factory: Lockport, N. Y.

FRANKLIN G TOURING

The seventh year for this model—the same high grade material and workmanship as the larger Franklin models.

BETTER THAN EVER BEFORE

Horse power with the G touring has been increased from eighteen to twenty-five.

Wheel base is 103 inches. The car turns around easily in a narrow street.

Tire equipment is 32" x 4" front and rear.

Franklin quality throughout, it is a high grade small car.

Body is of aluminum and will not rust, check or crack.

Full equipment included.

FRANKLIN AUTOMOBILE COMPANY Syracuse N Y

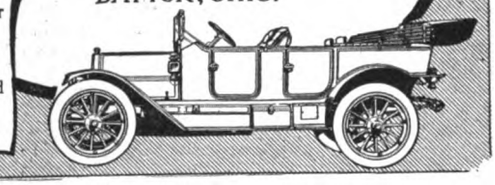
Speedwell

A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.

DAYTON, OHIO.

Touring Car
7-Passenger
$2,900
Fully Equipped
including
Self-Starter



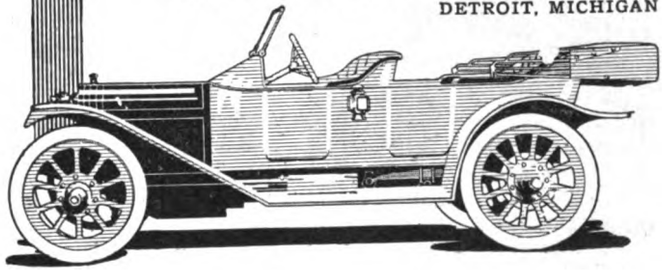
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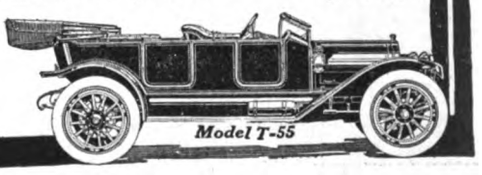
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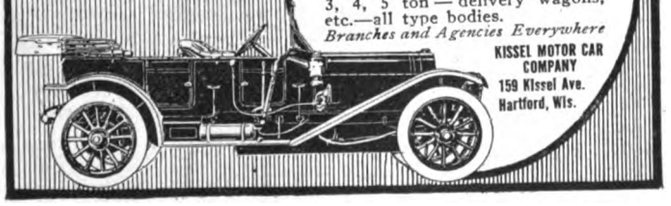
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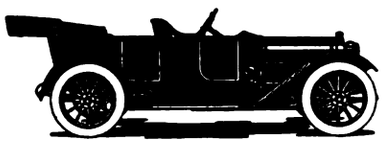
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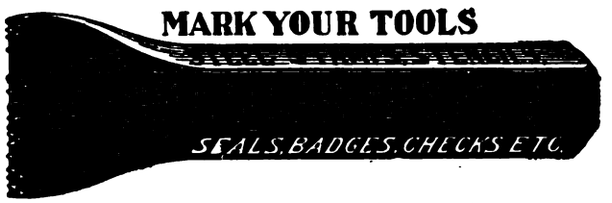
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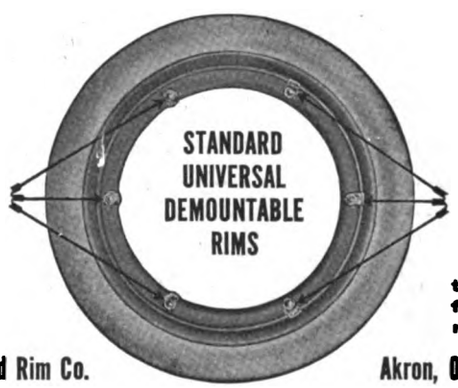
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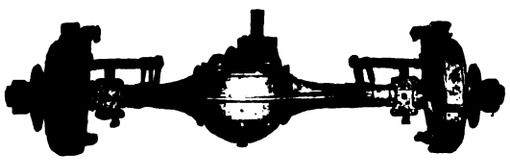
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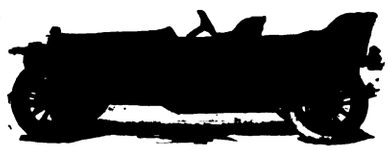
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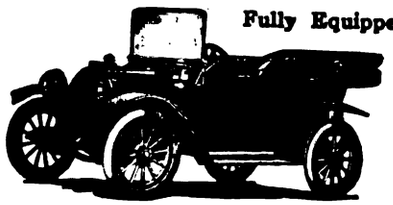
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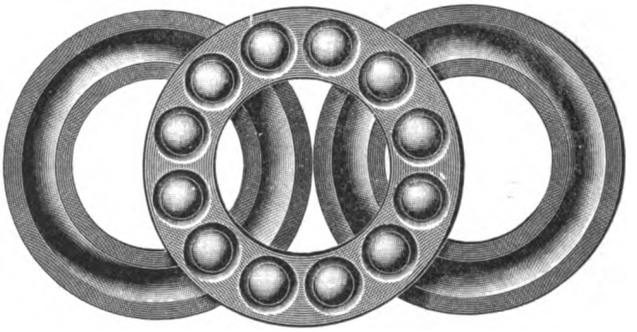
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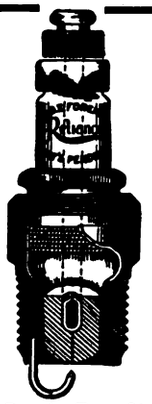
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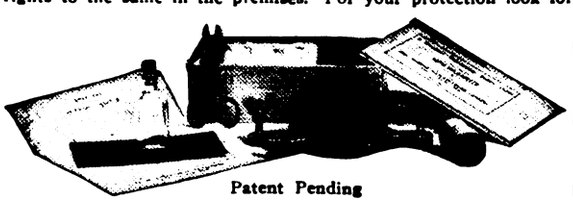
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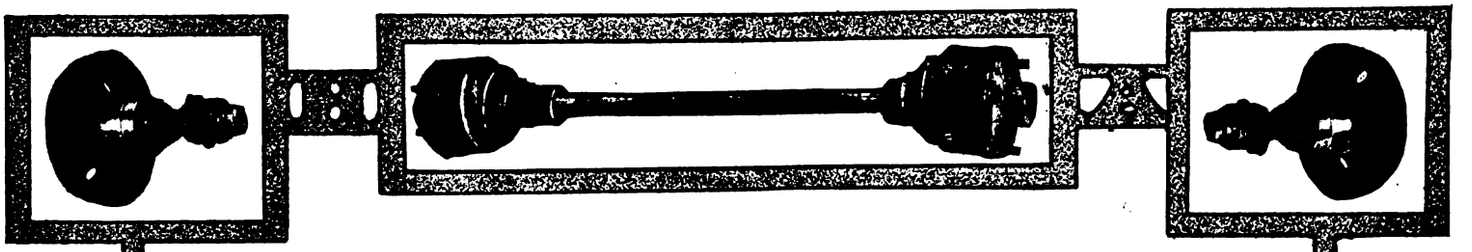


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ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio

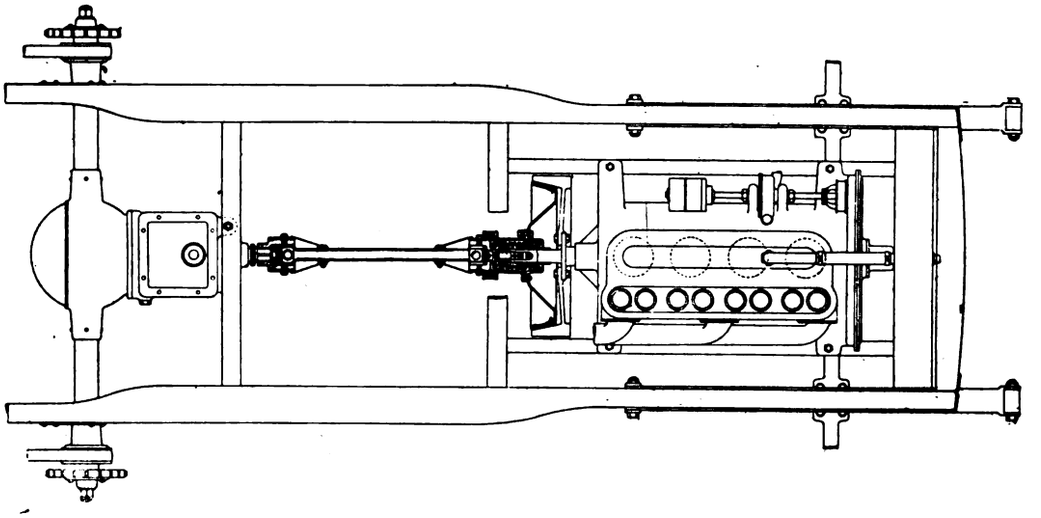
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The M-600 clutch with special long shaft, shown here, is the logical installation for standard truck design—particularly adapted to straight drive.

Hartford quality and Hartford engineering skill are responsible for this masterpiece, now standard on a large majority of commercial trucks

In the selection of material we have made it a point to secure steel that will resist the most severe torque or other strain that can be placed upon it.



In this selection, we have also made most liberal allowance in the margin of safety and every universal leaving this factory is tested to withstand a strain far and away beyond that which could occur in practical use.

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Send us your blue prints or specifications—if specifications, we will furnish you the blue prints and prices. If you have the blue prints, then we submit prices and other details still more promptly.

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FACILITIES – AXLES – RIGHT STEEL
"Made in the Largest Axle Factory in the World"

Axle Talk—No. IV

"By Their Works Shall Ye Know Them."

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Some of the best known commercial trucks have been forced upon the market through a liberal expenditure for advertising.

A good axle does not need a vast amount of advertising—it is sold in quantity to the manufacturer and if it breaks or gives way under ordinary stress and strain, then the producer of that axle loses the trade of the car manufacturer.

It stands, then, that an axle must, of necessity, advertise itself to the manufacturer of the car.

SHELDON axles have advertised themselves through their reliability.

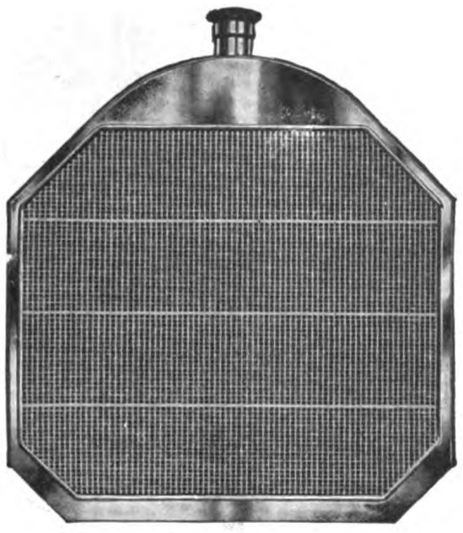
If you, as a maker of cars, buy axles from a manufacturer minus reputation, you are taking as long chances as if you were making a loan without security.

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¶ They are proof against leakage except through positive injury.

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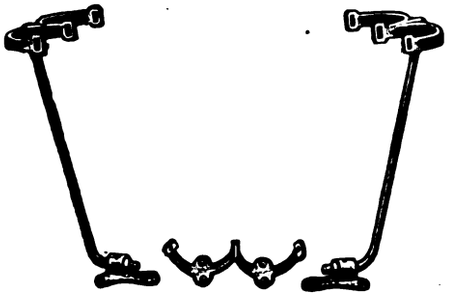
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MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

HOME OFFICE

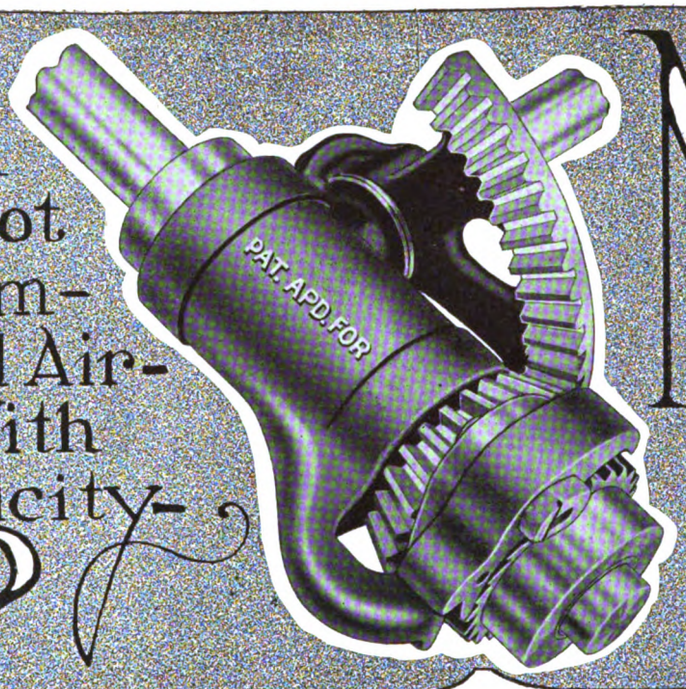
97-99-101-103 Reade St., New York City

ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

NEW YORK CITY—97-103 Reade St.
NEW YORK CITY—924 Eighth Ave.
NEW YORK CITY—2782 Broadway.
BUFFALO, N. Y.—824 Main St.
BROOKLYN, N. Y.—1421 Bedford Ave.
ALBANY, N. Y.—135 Central Ave.
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HARTFORD, CONN.—274 Trumbull St.
DETROIT, MICH.—227-229 Jefferson Ave.
CLEVELAND, OHIO—1829 Euclid Ave.
PHILADELPHIA, PA.—318 North Broad St.
ATLANTA, GA.—66 Edgewood Ave.
NEW ORLEANS, LA.—601-603 Barrone St.
NEWARK, N. J.—274 Halsey St.
SPRINGFIELD, MASS.—Bridge & Dwight Sts.

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Not With Gas - Not With Com-pressed Air - Not With Electricity - ?



The NATIONAL Starter

The Finality of Self-Starting Evolution

This is the Answer

This self starter turns over your engine as it should be turned—naturally, mechanically, unfailingly.

You simply crank from the seat through a simple pressure of the foot instead of descending to the street and going through the back-breaking, dangerous, old-fashioned process.

The **principle** is the same—the **method** is different and the **operation** is instantaneous, requiring no physical exertion.

Now, eliminating the danger of injuring the engine through the violent blow struck on the piston head by the gas starter—eliminating the ever present danger of gas explosions—forgetting the percentage of failures characterizing all gas, compressed air and electrical devices

Remember that the National Self Starter entails no cost of operation. Its first cost is its last cost and the economy it accomplishes will eventually pay for it.

This starter is the last word in self starter evolution.

It is the application of a simple mechanical principle that cannot fail nor go wrong.

It insures you against the danger of back-firing, is as easy to operate as any more complicated device and will outlast, in time and service, any other self starter on the market.

Simplicity is perfection. The National Self Starter is just as simple as it looks in this illustration and coming as it is into favor in leaps and bounds, it is up to you to get in on unoccupied territory while it still exists in your locality.

Write and let us explain to you the principle, the product and the price.

You can make a handsome profit out of your connection with us and build a trade that will well justify your first efforts.

NATIONAL GAS ENGINE STARTER COMPANY

20-32 North Dearborn Street **CHICAGO, ILL.**

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

The TUTO Horn Does Not Compete.

HERE is an automobile necessity that is not competitive.

¶ It is not competing for the loudest note which it is possible to produce, for the regular use of such warning devices rightly invite drastic legislation.

¶ It is not competing for honors as a medium tone, so-called "non-offensive" signal of questionable effectiveness.

¶ The TUTO Horn is in a class by itself as it is the only single warning device that will do all of the signalling of the car without being supplemented by another warning device of low or loud tone—for every car owner acknowledges that some mild signal note, such as the bulb horn, must be available for regular service (required by law in many parts of the world) and that a loud abrupt note be instantly available for emergencies (also required by ordinances in many American cities.)

¶ Thus, if the one-tone-loud-note electric horn is used, the bulb horn must be retained for ordinary service, requiring a duplication of equipment and confusion in operation.

¶ The TUTO Horn does all of the signalling of the car in the one horn, the one push button and the one connecting cord without complications and with the utmost ease in operation—a light pressure on the button gives a low service signal and a full pressure on the same button, the loud emergency note. It is possible to go from the low to the loud note instantly, and either note can be sounded or prolonged at will.

¶ This makes the TUTO Horn the best warning signal for standard equipment, for it does all of the signalling in one device and has no competitors.



TUTO Horn, $25.00

The Dean Electric Co.

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



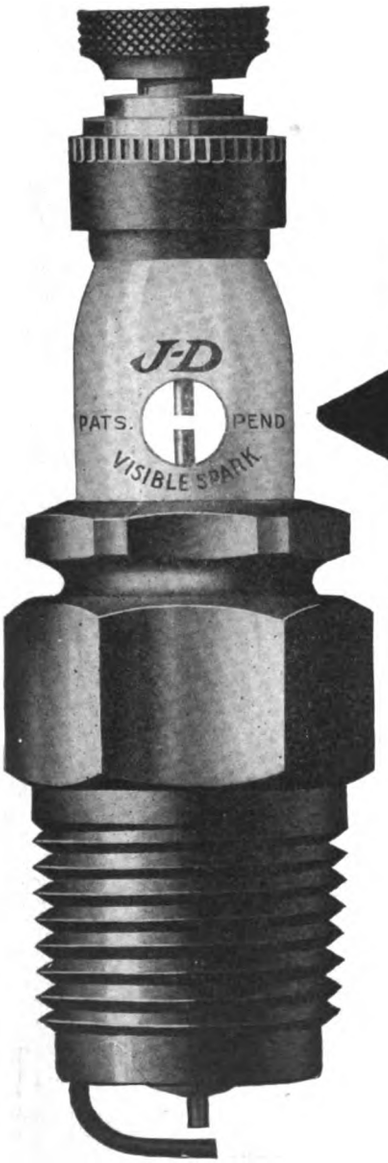
TUTO-ETTE $17.50

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One Look Tells Everything

The JEFFERY-DEWITT CO. DETROIT, MICH. Visible Spark Plug lays bare all ignition trouble

The "visible gap" is an open "window" giving you a full view of the internal workings of your spark plug.



If the spark is seen jumping the gap, look for your trouble between the gap and sparking point.

If there is no spark in the gap, your trouble is behind the plug—in Magneto, or batteries, or coil, or wiring.

But for the "visible gap" it would take you many precious minutes—often hours—to locate the seat of trouble.

$1.00 **Buys this great new Spark Plug**

Indicates in which direction trouble lies.
Facilitates timing of engine.
Intensifies spark in cylinders.
Consumes only minimum current.
Gap adjustable—can be closed entirely.
By widening gap plug cleans itself.
Permits regulating spark for any cylinder.
Costs same as any good plug—$1.00.

Dealers will find J. D. Visible in greatest demand

Visible Idea Worked Out Perfectly for the First Time

The "visible gap" feature, so far as being incorporated in a plug, has always seemed as far away as perpetual motion. The visible feature has been marketed in a separate device for years, but this is the only plug embodying the visible feature in a practical manner.

It is simple. Merely a hole in the porcelain and a spiral action to regulate length of gap in the central electrode which carries the current.

The hole in no way lessens the strength of the plug, and the current in jumping the "visible gap" loses none of its efficiency. On the other hand it intensifies the spark at the gap in the cylinder.

Additional prestige is lent the J. D. Visible Spark Plug by the fact that it is being introduced by the largest manufacturers of spark plugs in the world. We are exclusively manufacturers of spark plugs; we make millions of them each year.

The J. D. Suark Plug was a famous plug before it was improved by the visible feature. It combines finest workmanship, best materials and simplest designs.

Every part of this plug is made in our factory—even the porcelain being produced in our own potteries from clays and other ingredients imported from Europe.

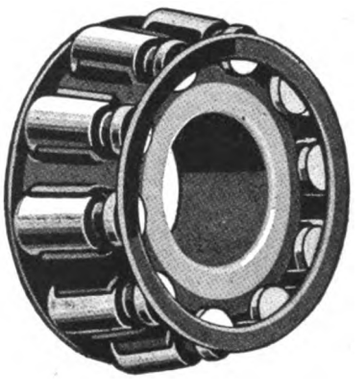
This unequivocal guarantee goes with all our spark plugs:

"Your money back or a new plug if you are not satisfied"

If your dealer hasn't the J. D. Visible yet, send your money direct to us for a set, and we will ship them postpaid. Remember, the J. D. Visible Plug is only $1.00. Write today for our literature on ignition. It is free.

Jeffery-Dewitt Company, 565 Butler Ave., Detroit, Mich.

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WHEN bearing wear comes—what can you do? Even very slight wear in wheel bearings allows the wheels to wobble and that brings extra wear on tires—unnecessary expense.

Wear in the bearings of the propeller-shaft allows it to drop a trifle at the pinion. Besides disturbing the perfect mesh of pinion with driving gear, the propeller-shaft has to bend just a hair every time it revolves. That takes extra power from the engine.

Any wear in transmission bearings brings the shafts slightly out of alignment—that makes extra friction and noise.

TIMKEN
TAPERED ROLLER BEARINGS
are adjustable—perfectly—for wear

In every place where they are used, the bearings should keep the shafts in alignment, keep gears in correct mesh, support the loads, take the "end-thrust" and all the time, hold friction down to a negligible quantity.

They must do these things when the car is new and they should do them when the wear inevitably comes.

There is no getting away from wear and there is no getting away from the necessity for adjustment to take up that wear.

The Only Perfect Adjustment

Timken Bearings, like all other bearings, will show wear in time.

But the Timken has this distinct advantage over all other types of anti-friction bearings—

It can be adjusted to completely take up the minute wear—and adjusted without the least sacrifice of its original principles of efficiency.

The two ribs on the Timken cone keep the tapered rollers always in perfect alignment—therefore the diminutive wear is uniform over the surfaces of cone, rollers and cup.

When the cone is moved just a trifle farther into the cup all the parts are brought into the same identical relation to each other that existed when the bearing was made.

No grooves can wear in the races. The rollers, though microscopically smaller, have still the same taper and, after adjustment, are just as snugly in perfect rolling contact with cup and cone as they were at the start.

Not a single principle of its efficiency is altered by adjustment of the Timken Tapered Roller Bearing.

You'll be interested to know the names of the builders of pleasure and commercial cars using Timken Bearings. A big majority of American cars are named in our booklet, "The Companies Timken Keeps." Write for a copy today.

The Timken Roller Bearing Company
Canton, Ohio, U.S.A.

The only axle manufacturer licensedto make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company

C9

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As Certain as Time

Costs Little to Buy **THE LONG HORN** Costs Nothing to Operate

No Battery - No Wire - No Friction Pulley - No Bulb - No Motor to Break or Fail to Work

If You Can PUSH THE BUTTON THE LONG HORN Always Works

Inside the Horn — The Horn Itself

THE STORY

A glance at the cut below tells the story of the Long Horn.

A slight push of the button by hand or elbow instantly sets the three small gears in motion which, in turn, revolve the vibrator at a terrific speed.

Sound May Be Regulated by Operator

The revolving vibrator brings the hardened roller bearings into contact with a button on the metal diaphragm, thus producing the sound, which may be regulated to any volume desired.

The Long Horn can never fail. Just as surely as you push the button, just so surely the horn will work.

DEALERS

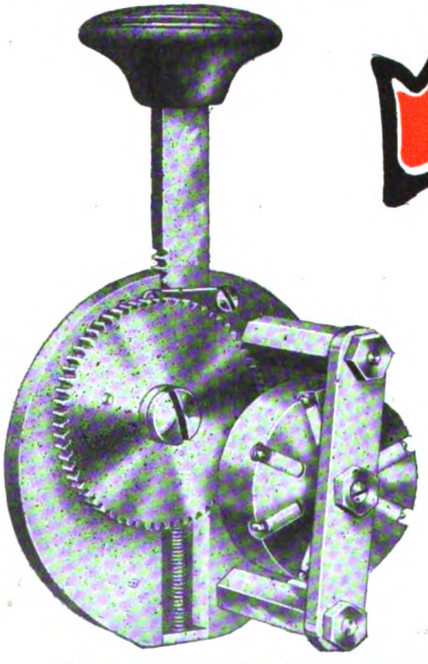
No accessory in existence has more merit or greater selling possibilities than the Long Horn. Considerable territory is yet unallotted. Get in touch with us today if you want to represent the greatest advance in warning signals yet recorded.

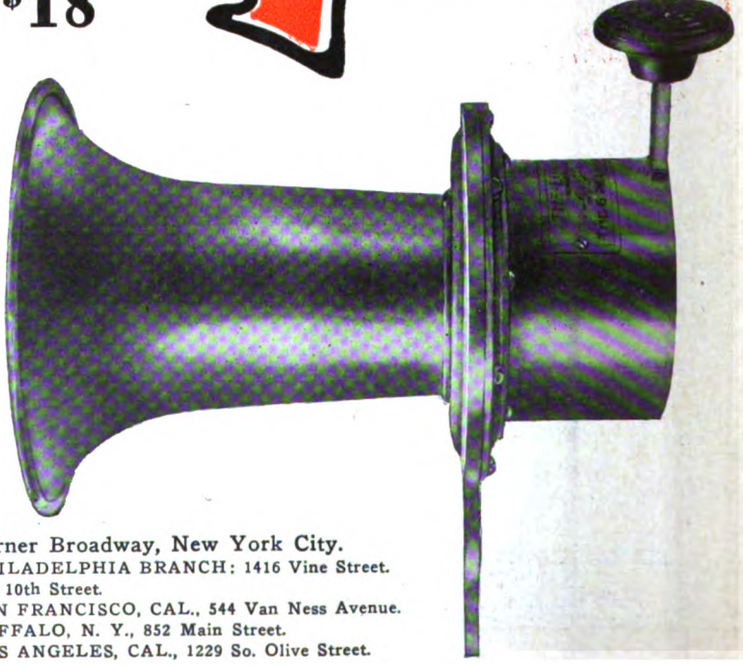
Long Horn Dealers Are Making Big Money

The fact that the Long Horn is as loud, penetrating and sonorous as the best electric horn you ever heard and a hundred per cent more dependable and serviceable—that it can never get out of order—that the dealer's discount is liberal, tends to make the Long Horn agency one of the big money making departments of any supply house.

Get in touch with us today. Don't delay. You may be too late tomorrow.

Retails for $18





The G. Piel Company

13th Street and Boulevard

LONG ISLAND CITY N. Y.

Sales and Attaching Rooms, 51 West 63d Street, Corner Broadway, New York City.

BOSTON BRANCH: 109 Massachusetts Ave.
PHILADELPHIA BRANCH: 1416 Vine Street.
MINNEAPOLIS BRANCH: 70 South 10th Street.
DENVER, COL., 15th and Curtis Streets.
SAN FRANCISCO, CAL., 544 Van Ness Avenue.
PORTLAND, ORE., 329 Ankeny Street.
BUFFALO, N. Y., 852 Main Street.
SEATTLE, WASH., 971 E. Pike Street.
LOS ANGELES, CAL., 1229 So. Olive Street.

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To Automobile Dealers Who Think

What are Your Plans for this Year?

The advancement of an industry is shown by the wrecks of the companies who participate in its progress.

This is true with all industries. Failures occur during the most prosperous times, just as they do during periods of panic.

What Failures Show

In 1910, 446 clothing manufacturers, for instance, failed. This in prosperous times. The liabilities totaled $4,826,047.

Yet the big manufacturers grew. They were not affected. They felt no money stringency. They did not even feel the effect of severe competition. Their progress was made at the expense of the less competent—less successful makers.

That holds true with the automobile industry. Some manufacturers will continue to grow bigger. Theirs will be big lines. Companies manned by men of inexperience and insufficient capital will be unable to survive.

Even when the demand was great, there were many failures. But as competition becomes harder, as those successful makers develop their business and are able to eliminate wasted effort, it will be harder for the less competent. It is the same with men as with industries.

We are now closing agency arrangements for 1913. Our entire 1912 product was in excess of 2,500 cars oversold and yet dealers were well cared for. Demand exceeded our estimates by that number. Just as we constantly scan the industry for the most efficient men—whether they be testers, machinists, superintendents or managers — we are as watchful for dealers who can make good.

Be Identified With a Success

This advertisement is merely to suggest that you note what the HUDSON has done each year of its career.

There has not been a single momentary stop or failure. Perhaps you, too, would like to be identified with its organization. At any rate, close observance of its progress indicates pretty thoroughly the advancement the industry is making.

Dealers Get Real Help Here

If you would like to know something of the unusual way in which the combined ability of this organization is made to aid its dealers, and think you live in a territory in which we need just such live, energetic and thorough representation as a thinking dealer such as yourself can give, please write at once.

1913 contracts are being made. Our plans are the most attractive we have ever had. They include a "Four" and a "Six," which you will admit, when you have seen them, have no superior in quality, comfort and richness, in any car of their respective classes, regardless of price. No man is too capable for us—none too aggressive. We want the best and are willing to make the proposition the best any one can demand.

The Money Making Line is neither the right car nor the right price nor the right merchandising. It is all of these combined in the right proportion.

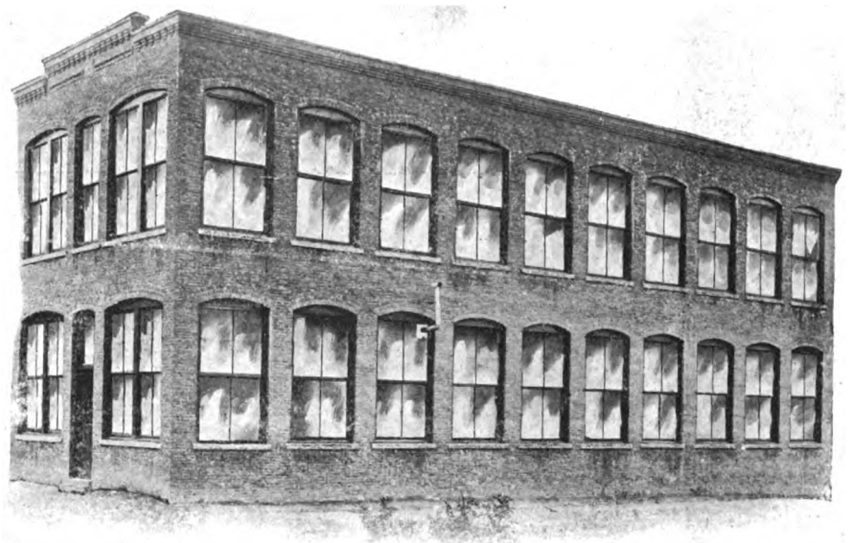
HUDSON MOTOR CAR CO.

7348 Jefferson Avenue, Detroit, Michigan

146

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New Departure Engineering Building



METALLURGICAL LABORATORY : CHEMICAL LABORATORY
PHYSICAL LABORATORY : HEAT TREATING LABORATORY
ENGINEERING SERVICE DEPARTMENT

Every inch of the large floor space in this building is devoted to two supremely important purposes:

The perfection of New Departure ball bearings by progressive improvements in materials, manufacturing processes and general efficiency of the product.

A study of the practical problems and interests of users of anti-friction bearings, with a constant aim to assist in selecting just the ball bearing equipment that will give greatest efficiency at minimum cost of installation and maintenance.

We have secured an equipment for each department that is not excelled anywhere, particularly with reference to ball bearing manufacture and consultation service.

Our exceptional facilities are yours for the asking. In other words, the co-operation of our entire engineering department is at your command for the selection of the type and size of ball bearings adapted to your design and work. Write us today.

The New Departure Manufacturing Co.
BRISTOL, CONN.

Western Branch, 1016-17 Ford Bldg., Detroit, Mich.

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STOP BURNING TIRES

Excessive heat hardens rubber.

Driving an automobile creates excessive heat in the tires.

If your tires are mounted on wooden wheels, that excessive heat stays within the tires, hardens them, causing blow-outs and ruination of the tires early in their life.

If the tires are mounted on McCue wire wheels, the heat is rapidly conducted into all parts of the metal and dissipated into the air.

In other words, wood is a non-conductor of heat and helps to hold the heat in the tire, while the metal in wire wheels, being a conductor of heat, frees the tires from the excess of heat and lengthens their life.

American manufacturers are coming to the use of McCue wire wheels in place of the inefficient wooden ones. Insist upon them on your cars.

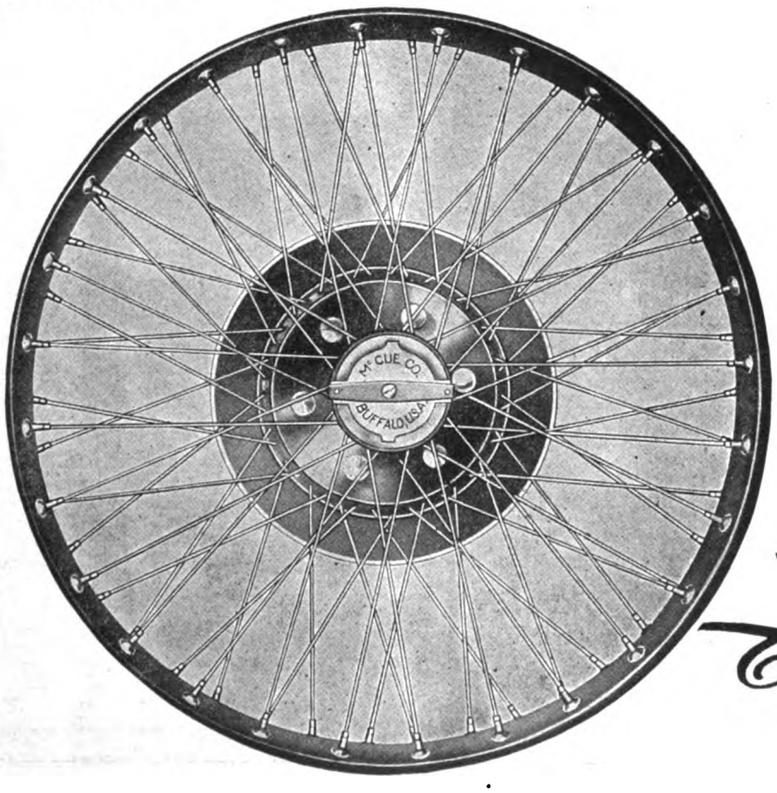
Not only do our wheels increase your car life, but they are stronger than wooden wheels—they absorb road shocks, permit greater motor flexibility and reduce the braking strain.

USE

70% MORE TIRE MILES

WIRE McCUE WHEELS

Wire Wheels Will Increase the Tire Mileage Fully Seventy Per Cent.



The Wheel of To-morrow

The McCUE CO.

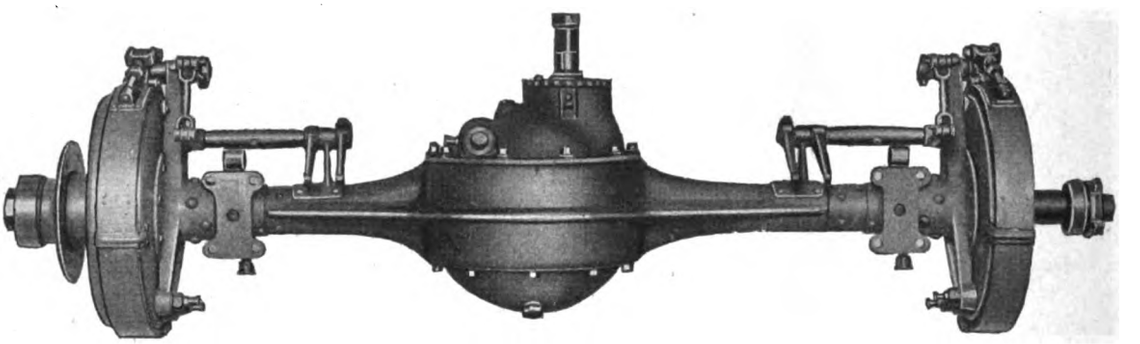
BUFFALO, N.Y.

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American

American Axles

American

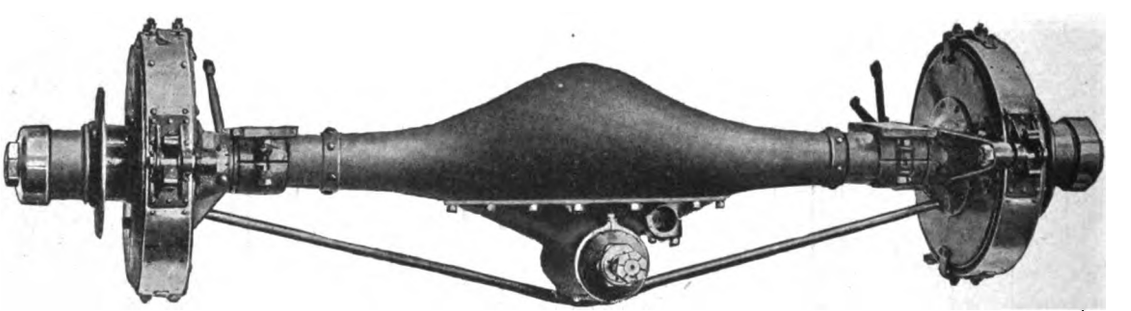


Whether it be a bevel or worm drive rear axle, the *American* should hold first place both in the mind of the manufacturer and the man who contemplates buying a car.

The fact that we built and successfully introduced the first bevel drive type of rear axle in America and now lead in the production of the worm drive type, in itself proves our superiority.

American Axles both bevel and worm drive, can be furnished for cars weighing up to 4500 lbs. and to 60 horsepower.

The worm and bevel in all cases are mounted on annular ball bearings of ample size with proper thrust bearings. Hubs can be equipped with annular or taper roller type bearings, as may be specified.

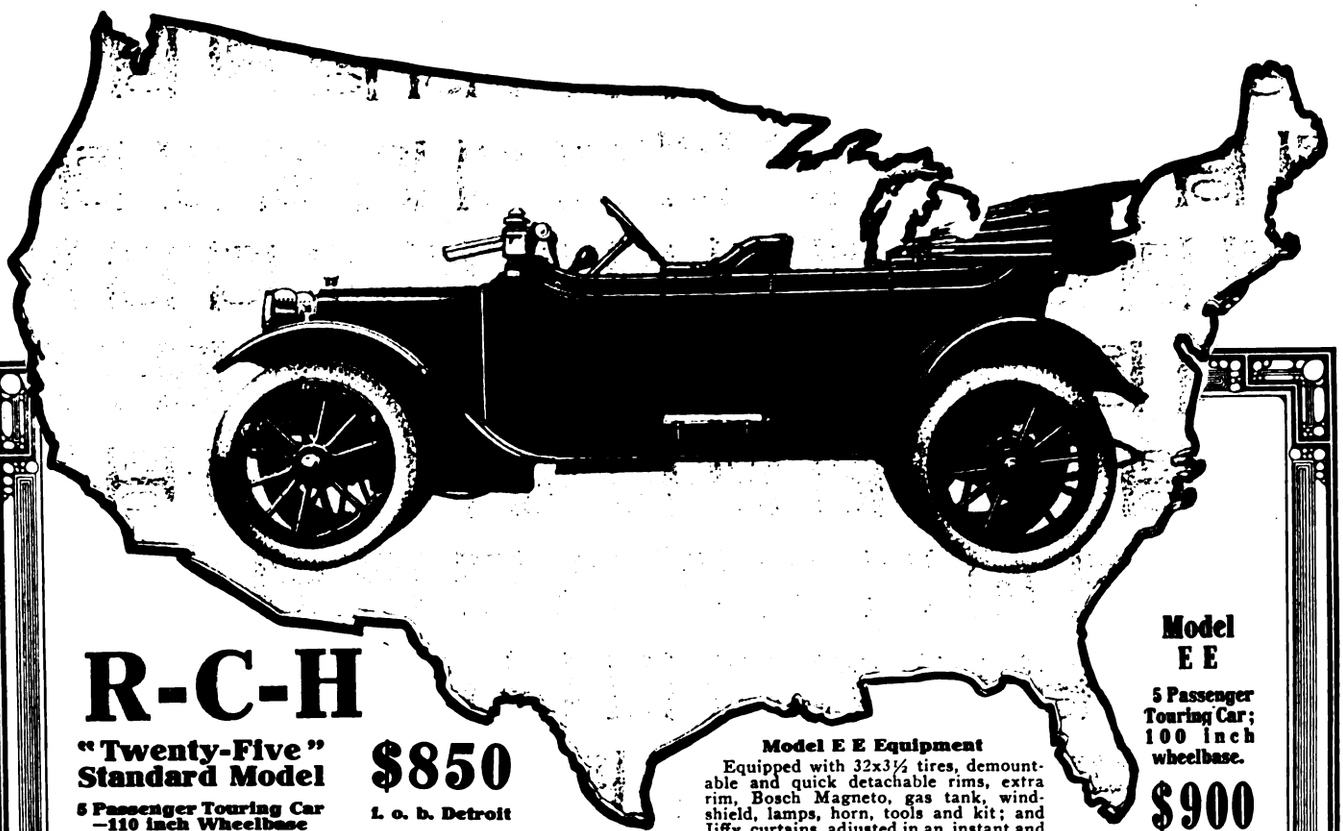


THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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R-C-H

"Twenty-Five" Standard Model **$850**

5 Passenger Touring Car —110 inch Wheelbase **f. o. b. Detroit**

Fully equipped with top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit; long stroke motor, 3 speeds, enclosed valves, Bosch Magneto.

Model E E Equipment

Equipped with 32x3½ tires, demountable and quick detachable rims, extra rim, Bosch Magneto, gas tank, windshield, lamps, horn, tools and kit; and Jiffy curtains, adjusted in an instant and make the car entirely weather proof. Long stroke motor, 3 speeds, enclosed valves.

Model E E

5 Passenger Touring Car; 100 inch wheelbase.

$900

Detroit f. o. b.

WE WANT 1000 DEALERS

TO SEND IN THE COUPON BELOW

HERE'S good news for the many dealers who wrote us during the early part of the year, but with whom we could not make arrangements because our entire 1912 output of 10,000 cars was already oversold.

Many sections had to go without R-C-H representation simply because we could not manufacture nearly enough cars to fill the demand.

For the coming season, however, things will be different. We shall make 30,000 R-C-H cars, and want an R-C-H dealer covering every county in the United States.

We do not think that a car which so nearly fills the ideal of the average motorist has ever before been offered within a thousand dollars of the R-C-H price. We do not think that greater all around satisfaction can be purchased anywhere for a thousand dollars more.

Your problem, Mr. Dealer, is to give your public the car that best meets their needs. List over in your mind the possible motor car buyers in your locality. Think just what each of them demands in his car. Then note what the R-C-H offers them. We think you'll agree that there's no other car which has so many different selling points.

So send in the coupon below. It won't bind you in any way, and it won't bind us. But it will give us a chance to get in touch, to learn more about each other, and perhaps to form a permanent arrangement.

Permanence—that is our idea. We don't want the one-season man, the vacillating man, the doubtful man. We've got the plant, we've got the car, we've got the price. If you got the ginger, the hustle, the stick-to-itiveness, write quick. For there's a better present and a bigger future for you with the R-C-H than anywhere else in the industry.

GENERAL R-C-H SPECIFICATIONS—**Motor**—4 cylinders, cast en bloc—3¼ inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive**—Left-side. Irreversible worm gear, 16-inch wheel. **Control**—Center lever operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

R-C-H CORPORATION, 104 LYCASTE STREET Detroit, Michigan

BRANCHES:
Atlanta, 548 Peachtree Street
Boston, 563 Boylston Street
Buffalo, 1225 Main Street
Chicago, 2021 Michigan Avenue
Cleveland, 2122 Euclid Avenue
Denver, 1520 Broadway
Walkerville, Ont. Canada

R-C-H CORPORATION, 104 Lycaste St., Detroit, Mich.

I want to know more about your car and your dealers' proposition.

I am now selling.....cars. My allotment is.....cars.

Name..... Address.....

Town..... State.....

SEND THIS COUPON TO-DAY

BRANCHES:
Minneapolis, 1206 Hennepin Avenue
New York, 1989 Broadway
Philadelphia, 330 No. Broad St.
Detroit, Woodward and Warren Avenues
Kansas City, 3501 Main Street
Los Angeles, 1242 So. Flower St.

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"Get-Rich-*Slow*" Wallingford

He lived in the middle ages and spent a *lifetime* making a single clock. Then only *kings* could afford time pieces, and the *best* they had couldn't compete with a Twentieth Century *dollar* watch. The clock that Robert Wallingford made lost forty minutes a day. It was like some speedometers *High price* didn't mean *efficiency*.

The *effort* that goes into *making* an article doesn't determine its *value*. If the astonishing *equipment* of the Stewart factory can make a *perfect* speedometer three times as *quickly* as others do, *you* ought to be *glad* to take the *saving*. You don't care what it costs *us*—it's what it's *worth* to *you* that *counts*. The Stewart Speedometer is worth as much as any speedometer *can* be worth. But it doesn't cost *more* than it's worth. It's a hundred per cent *efficient*. It never misses a second to the hour nor an inch to the mile. If we didn't make so many it would cost as much as any.

Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial, large figures, easily read; absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft, drop forged swivel joint, noiseless gears.

"ALWAYS ON THE JOB"



Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

STEWART & CLARK MANUFACTURING CO.

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Kansas City Cleveland
Philadelphia Minneapolis Indianapolis London Paris

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THE MOTOR WORLD
Hyatt Roller Bearing Editorial

Detroit, Mich., May 30, 1912

Purchasing a Car

Buying an Automobile is like buying a Rembrandt. One must be versed in the art or have implicit faith in the statements of the salesman. To know intimately the details of motor car construction requires more study than the average busy man can afford. Hence the alternative.

A Salesman makes Statements which he thinks will please the prospect. Many go into mechanical details with which they themselves are not wholly familiar. Points are made—to meet competition—which have no real comparative advantage for the car user.

The Average Purchaser is Interested in knowing four things about a car: Its first cost and its ultimate cost; its probable life and its dependability during life. Consideration of the first may be what attracts him toward a certain make It is then "up to" the salesman to demonstrate his car's superiority in the matter of the remaining three.

Most Cars Have Speed sufficient for ordinary use. The matter of equipment also is now almost universally looked after by the manufacturer; but these parts (such as lamps, windshield, etc.) are visible and easily appraised. Furthermore one need not be stranded and compelled to walk miles for help even if the speedometer does refuse to work properly.

The Invisible Parts are the ones that require investigation. Look into the engine, the axles and the gear box. Engine shafts mostly are mounted on plain bearings—hence cannot be discussed here. Axles and gear boxes are now practically all running in antifriction (roller or ball) bearings. Those not so equipped are rapidly being changed. Some reasons are: Power loss decreased; less wear and longer life; more easily lubricated and less attention required.

The Car to Choose is the one whose particular bearings have a vital and favorable influence on those four essentials. The bearings need not be—and probably are not—the most expensive that can be purchased. They are, however, the very best that can be made of their type, and they assist in the design of an efficient and economical car. In event of necessary replacement they will not be priced as though made of gold—a help toward that low ultimate cost. They will probably last as long as the car—anyway as long as other makes, and during life they can be depended on to carry the car so long as the engine will run. No more need be asked.

The Essential Qualities are maximum in Hyatt Flexible Roller Bearings.

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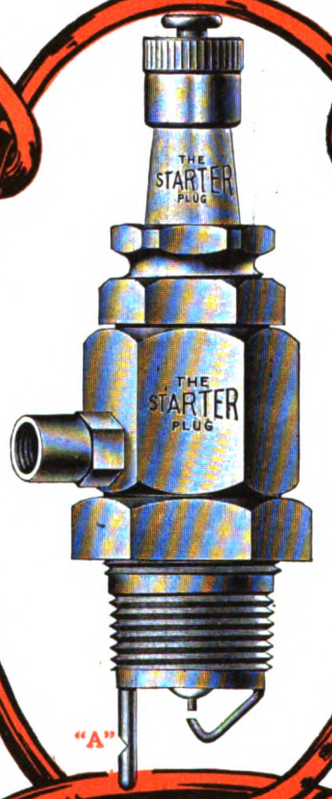
The Connecting Link

Ford · Buick · Stoddard-Dayton · Speedwell · Pope-Hartford · Elmore

The phenomenal success of the DISCO Self Starter has made an enormous demand for some method of equipping those cars which have no petcocks. Here is the connecting link—the new **STARTER PLUG,** with which Fords, Buicks, Stoddard-Daytons, Speedwells, Pope-Hartfords, Elmores, and all other cars without petcocks, are being equipped with DISCO, THE Self Starter—standard equipment for 1912 and 1913.

Simple
Efficient

The Last Word in Equipment



The simplicity of this, the new starter plug, is apparent from the illustration. The acetylene gas with which the DISCO Starter now makes cranking needless on 35,000 cars of all makes, is admitted through jet marked "A." By means of this jet the gas can be directed to secure the most efficient results, depending on the construction of the engine. It is adaptable to any type of cylinder and in any position. Can be used in connection with ANY acetylene starter.

Takes the place of all other spark plugs, and is readily screwed into place, giving the most perfect ignition results and having all the advantages, all the convenience of inspection and cleaning—and all the durability of the best spark plugs made. It is guaranteed absolutely. Patents pending.

Just a Word

TRADE MARK
THE STARTER PLUG
MANUFACTURED BY J. E. SCHAEFER
EXCLUSIVELY FOR
IGNITION STARTER CO. DETROIT, U.S.A.

This Trademark

on every box identifies the big seller and the business getter that YOU want. Remember this new Starter Plug can be used with ANY acetylene gas starter—is the only possible way of applying such starters to the certain makes of cars named above.

To All Manufacturers, Jobbers and Dealers:

Although we control Basic Patents on this device, we will quote wholesale prices to ANY manufacturer, jobber or dealer, or will send the Starter Spark Plug prepaid to anyone at $1.50 each. Give make and year of car and give name of dealer or jobber.

Make Your Car Up-to-Date

with a Self Starter. This "connecting link" removes the last excuse for denying yourself that luxury and comfort.

to the Trade

DISCO

—THE Self Starter

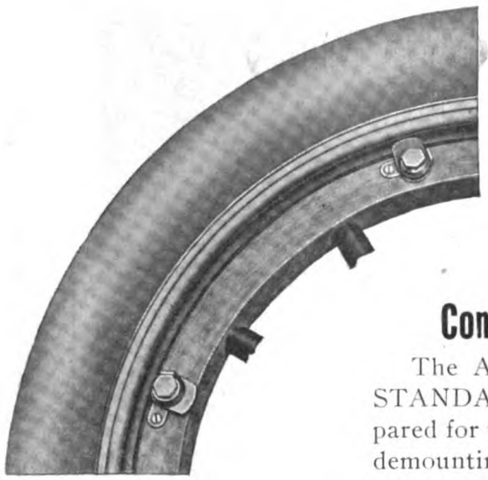
The small illustration shows why the DISCO Self Starter can be applied to ANY car in a couple of hours by ANY manufacturer, dealer or individual. It has but 12 parts; weighs but 4 pounds, and is now for sale by our 15 branches and dealers everywhere.

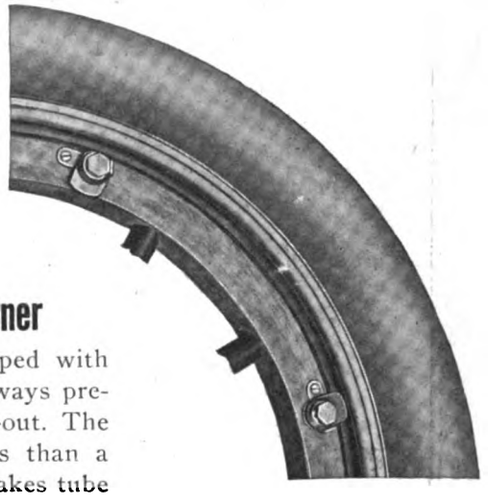
We always make prompt shipments; we can arrange for a few more agencies for DISCO Starters and DISCO Lighters. Write us.

IGNITION STARTER CO. Spark Plug Department
615 Dodge Power Bldg., Detroit, Mich.
Largest Manufacturers of Self-Starters in the World

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STANDARDIZATION OF RIMS MEANS





Convenience for the Auto Owner

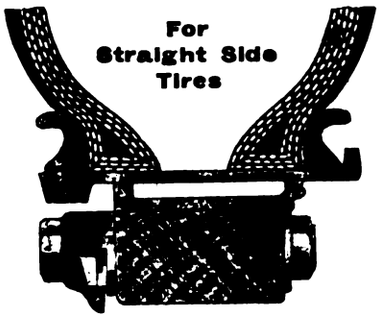
The Auto Owner whose car is equipped with STANDARD UNIVERSAL RIMS is always prepared for the unexpected puncture or blow-out. The demounting of a rim and tire takes less than a minute. The Quick Detachable feature makes tube changing simple. Any style of tire that you can obtain will fit a STANDARD UNIVERSAL RIM.

The removable rim flanges can be reversed—they curve outward on one side to fit a straight side tire, inward on the other to accommodate a clincher.

STANDARD UNIVERSAL QUICK DETACHABLE DEMOUNTABLE RIMS—Two turns of a nut unlocks the rim for demounting and two more turns locks the rim in place.

An Unrestricted Market for the Tire Maker

With STANDARD UNIVERSAL RIMS now being used by more than 90 per cent. of the automobile manufacturers, the tire maker is no longer handicapped in the sale of his tire. Any type or style of tire, whether a straight side or clincher fits a STANDARD UNIVERSAL RIM.



Easier Sales for the Auto Builder

When the Automobile Manufacturer equips his car with STANDARD UNIVERSAL RIMS he is taking a "short cut" to increased sales. He is furnishing his salesmen with another selling point and is offering the prospective purchaser the latest improvement in rim equipment. He can equip his customers' cars with any type or style of tires.

Catalogue No. 607 explains fully. Send for it.



STANDARD UNIVERSAL RIMS

THE UNITED RIM COMPANY, Akron, Ohio

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Studebaker
FLANDERS 20
Studebaker Automobiles
Two Models
Studebaker
E-M-F 30

If You Were an Expert, What Car Would You Buy?

The time has passed when automobiles can be sold to you on their appearances or claims. This is a day when you and every purchaser must be shown what the car for which you pay your money will actually perform; what it will do. Beware of an automobile salesman who attempts to beguile you with a pleasing story. Tell him to show the goods and ***prove*** to you that his cars are worth the money.. Find out whether his car is a real car or only an assembled automobile built to sell.

You have a right to your money's worth, but it is up to you to see that you get it. Deeper than all appearances, there are a few expert tests which ought to be applied to every car.

Who makes the car? Is it an assembled car or made from top to bottom by one manufacturer? What kind of a guarantee is on it? Does the manufacturer respect his own product with a real guarantee, or does he want you to take the chance? What do parts cost you and how conveniently can you get them? How many cars of this make are in service and how many are giving satisfaction? Questions like these go deep into the heart of the case, and if you put them rigorously upon any car you will find out with a certainty whether or not that car is worth its price.

We are selling Studebaker E-M-F "30" and Flanders "20" cars because we know that, dollar for dollar, their equal is not sold in the market today. The records of many thousands of cars in all kinds of service have convinced us absolutely. Studebaker E-M-F "30" and Flanders "20" cars are built to run, and because they run they sell. If we cannot prove to you under the most searching test that Studebaker cars are absolutely the best automobile values in the market, we do not want your business; but we ***can*** prove it, and your neighbors who drive these cars will tell you the same thing.

Be an expert when it comes to buying a car. You can, by getting from us some further ideas on real tests of an automobile. Clip the attached coupon and sent it to us now, because we have something new to tell you which you ought to know, whatever car you have in mind.

The Studebaker Corporation

Detroit, Michigan

TEAR OFF HERE

STUDEBAKER CORPORATION, Detroit, Mich.:
I'll be glad to know how you think a man ought to buy a car, if he wants his money's worth.
Name.....
Address.....

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NOTICE

Shock Absorber Patent Again Sustained
Foster Shock Absorber Enjoined

ON May 4, 1912, the District Court for the Southern District of New York again affirmed the validity of the Truffault Patent, and held that the FOSTER SHOCK ABSORBER was an infringement, and issued an injunction restraining its further manufacture, sale and use. Thus another infringer of our rights has been disposed of.

We take this opportunity of repeating our former warning that we shall prosecute vigorously all infringements now on the market or any which may spring up in the future.

HARTFORD SUSPENSION COMPANY

Makers of the Truffault-Hartford Shock Absorber

EDW. V. HARTFORD, President

164 Bay St., Jersey City, N. J. Main Offices and Factory

BRANCHES :

NEW YORK, 1700 Broadway.
NEW YORK, 212-214 West 88th St.
JERSEY CITY, 141-143 Morgan St.
BOSTON, 319-325 Columbus Ave.
CHICAGO, 1458 Michigan Ave.
DETROIT, 803 Woodward Ave.
KANSAS CITY, 1524 Grand Ave.
NEWARK, 289 Halsey St.
PHILADELPHIA, 1437 Vine St.

Truffault-Hartford SHOCK ABSORBER

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Overland

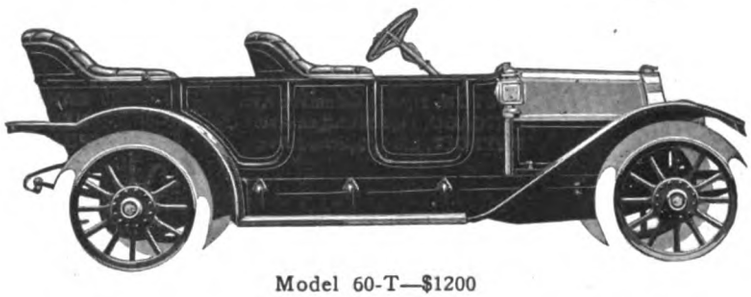
WE ARE enthusiastic over our Model 60 Overland at $1200; that is why we have spent thousands of dollars emphasizing its merit through the best advertising mediums. We are confident in our knowledge that you get no more for $1500 in any other line.

We make more Model 60 Overlands than any car of the popular priced class. This means that we make them more economically. You have noted the many similar cars on the market with the very dissimilar price marks. It is all the result of factory methods and huge output.

When you buy the Overland Model 60 you save yourself the difference in price.

Write at once for full details. Ask for book I-45.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, May 30, 1912. No. 10

RUBBER CONTRACTS IN DISPUTE

Brokers Sue Michelin for Large Sum and Continental Sues Broker—Claims of the Several Litigants.

Suits which were commenced about nine months ago in Supreme Court for New York county by Frans Poel and Charles H. Arnold, trading as Poel & Arnold, rubber merchants, of New York city, against the Michelin Tire Co., of Milltown, N. J., for some $300,000 for breach of contract have been listed for trial at the June term. The litigation apparently grows out of the rise and fall of the price of crude rubber.

There are seven suits in all involving eight contracts which were made by Poel & Arnold with the Michelin Tire Co., most of the rubber to be secured by the complainants in London and shipped to the Michelin factory. Most of the contracts were to run during the year 1911 and called for shipments each month, there being a maximum and minimum monthly shipment specified in each contract. Everything appeared to go well until about this time last year when disputes arose and the Michelin people declared they would have no more to do with any of the contracts until these differences were adjusted. At about the time the dispute arose, rubber dropped in price far below the figure at which the contracts were made. The contract price was in the neighborhood of $1.76 and upwards per pound, but later it gradually fell to about $1.

In its answer to the complaint the Michelin company claims for one thing that the rubber was not up to the Michelin standard and that it was not entirely available for use in tires of the quality which the Michelin company makes. It is alleged also that deliveries were not made according to time schedule and that when the company desired a minimum shipment the rubber men did not accede to the requests and sent more rubber than was wanted. Poel & Arnold claim certain shipments of the spring of 1911 are unpaid for and estimate their damages during the latter half of 1911 upon the difference between the contract price and the market prices which prevailed in different months.

In the same court, there also is pending another suit involving a rubber contract in which, however, the Michelin-Poel situation is reversed. In this second action, the Continental Rubber Works, tire makers in Erie, Pa., are the complainants and W. H. Stayton, a New York rubber broker, the defendant. Stayton, who has been the president of several rubber companies and who is well know in the crude rubber trade, is charged with contracting to sell the Continental company $10,000 worth of crude stuff, of which, it is alleged, but only about $3,000 worth was delivered. As the plaintiffs had paid the full amount, they are suing for the return of some $7,000.

Gramm Passes Out of Gramm Company.

B. A. Gramm, having resigned the vice-presidency of the Gramm Motor Truck Co., of Lima, Ohio, control of which recently was acquired by John N. Willys, of the Willys-Overland Co., George W. Bennett, vice-president of the latter company, was elected to fill the vacancy at the meeting of the directors on Thursday last, 23d inst. The other officers as permanently chosen are as follows: President and general manager, John N. Willys; secretary, James E. Kepperley; treasurer, Walter Stewart; assistant general manager and factory manager, Harvey L. Hooke.

Stacey, Reorganized, Becomes Perkins.

Following internal reorganization, which brought with it an accession of new capital, the Wm. N. Stacey Mfg. Co., of Springfield, Mass., has changed its name to the Perkins Appliance Co., and will continue to market the Perkins gas-electric lamp lighter and engine starter as heretofore, but on a larger scale. F. E. Muzzy is president and treasurer of the company, which is capitalized at $100,000. The other directors are J. L. Perkins, J. A. Perkins and Wm. N. Stacey, all of whom were identified with the Stacey company.

BODIES MAKE WORK FOR COURTS

Epidemic of Litigation Born of Disputes Between Body Builders and Car Makers —One Suit Amicably Settled.

For some reason, disputes over bodies have constituted the bases for an unusual number of the automobile cases which of late have occupied the attention of the courts, two more of them being now listed for trial in Supreme Court for New York county. One is entitled, Holbrook Co. vs. Palmer & Singer Manufacturing Co., the other, Brewster & Co. vs. Benz Auto Import Co. of America.

Besides being sued for $5,788.50, the alleged price of six bodies and labor connected with placing the same on chassis, the Palmer & Singer company claims it is minus six chassis, worth $15,000, which are being held by the Holbrook Co. From the standpoint of the Palmer-Singer company, the Holbrook Co. has all the best of the transaction as it now stands, as the former besides defending the action is making an effort to get something out of the deal, having set up a counter-suit for the value of the chassis that are held by the complainant.

The charge is that the Palmer & Singer company contracted for six Holbrook bodies which were to be fitted to chassis, the latter to be furnished the Holbrook Co. for the purpose, and that the bodies were built and fitted but that the bill never was paid. The defense is that the contract called for bodies to be built and fitted according to specifications and delivered on credit, but that the Holbrook Co. has failed to carry out the contract. The credit part is likely to enter into the argument. If the bodies were delivered on credit the Palmer & Singer company would have an opportunity of returning them if unsatisfactory and refusing to pay for them. That the bodies are unsatisfactory has not been proven. The complaint is "We want our money." The defense may be summed up

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as, "We don't want the bodies, but we do want our chassis back."

The Brewster vs. Benz Auto Import Co. of America suit involves an original contract for twenty-five bodies, which among other things, stipulated that the bodies were to be completed by October 15, 1911, or in case sufficient chassis were not forthcoming by that time 40 per cent. of the price of those bodies undelivered was to be paid December 1, 1911, and an additional 25 per cent. April 12 of this year. Ten bodies were delivered and paid for, but when no more chassis were furnished the body company asked for its 40 per cent. and the defendant admits it refused the demand. The hitch lies in a clause which the Benz company claims was violated in that the body company while the contract was still in force brought out a slightly different style of body at a lower price, the claim being it agreed not to do anything of the sort. This is given as the reason for Benz refusal to accept more bodies. The complainant asks $10,400, its 40 per cent., while the Benz company asks that the suit be dismissed.

Another action involving bodies and brought by Henry B. Singer, as trustee in bankruptcy of Rothschild & Co., New York, body builders, against the Benz Auto Import Co., to compel payment on a contract for bodies, was amicably settled last week and the suit was discontinued. The amount of settlement is not public property, but is said to have been less than $1,012, the figure asked by the complainant. The Rothschild company claimed it built two bodies for the Benz company, but that they were not accepted and paid for. They were sold at auction and the amount sought represented the difference between the contract price and the auction sale price.

Truck Makers Again to Reason Together.

To further the good work accomplished by the similar conference which was held in March last, the second convention of commercial motor vehicle manufacturers will be held in New York on Monday next, June 3rd, under the auspices of the National Association of Automobile Manufacturers. Among the topics which tentatively have been proposed for discussion are the following: Standardization; frame widths and lengths; heights of frames and platforms from ground; proportion of useful load to chassis weight and tire sizes; tire mileage of trucks in various cities; standard caution plate; census of production; insurance rates for fire, liability, collision and property damage; proposed bill for truck registration.

Truck Company Acquires Wrench Factory.

What was formerly the factory of the Elkhart Wrench Co., in Elkhart, Ind., has been remodeled for the occupancy of the Bucklen Auto-Truck Co. Machinery now is being installed, and it is stated that the manufacture of Bucklen trucks will be commenced in earnest.

NAPIER'S MASTER PATENT FAILS

German Decision Favorable to His Wire Wheel Claims is Reversed—Advantage Now Rests With Rudge-Whitworth.

The promised battle over the validity of the J. S. Napier German patents for a detachable wire wheel will not take place after all. Prior to the appeal of the Rudge-Whitworth Co., against which company Napier brought action for infringement of German patent No. 194,073, and received a decision, the Rudge-Whitworth Co. instituted proceedings to have the patent annulled on the ground that a prior British patent, No. 18,377, issued in 1904, antedated the one in question. On the 13th inst. the action was heard in the German court and resulted in favor of the Rudge-Whitworth Co. Consequently, it is quite probable that the revocation of the alleged master patent will have the effect of reversing the original decision in favor of J. S. Napier and the hearing of the appeal action will be unnecessary.

As originally tried, when a decision in favor of Napier was rendered, there were two defendants, namely, the firm Rudge Rad G.m.b.H., 32 Kochstrasse, Berlin, and the firm Rudge-Whitworth, Coventry. The whole trouble grew out of the manufacture and sale by the Rudge-Whitworth of wire wheels in Germany after a license from Napier had expired. According to the decision in favor of Napier, the Rudge-Whitworth Co. was enjoined from manufacturing and selling the wheels in Germany, and ordered to give the plaintiff a statement of the number of wheels manufactured or imported into Germany since January 4th, 1912, and to pay three-fourths of the costs and to give a security of $1,875.

Pennsylvanians Enter Croxton Company.

Preliminary to its removal to Washington, Pa., which is in the heart of the coal and natural gas belt, the Croxton Motor Co., of Cleveland, O., is being reorganized as a Pennsylvania corporation under the style, Croxton Motor Car Co. It will be capitalized at $300,000 and, although J. P. Stoltz will retain the presidency and general management, substantial residents of Washington will enter the directorate. They are as follows: John H. Donnan, vice-president, of the Citizens' National Bank; A. M. Linn, President of the First National Bank; A. C. Warne, Treasurer of the Washington Trust Company; J. D. Bigger, Director Real Estate Trust Company; C. S. Caldwell, of the A. B. Caldwell Company; and G. W. Dudderar, Managing Secretary of the Washington Board of Trade; and J. I. Brownson, Attorney at Law, Director of the Washington Trust Company. On the site which has been secured in Washington, will be erected a brick and concrete plant, of which the main factory will be 120 x 500 feet. It will have a capacity of 1,000 Croxton cars per year. The Croxton taxicab, which will constitute the chief production, will be of the present type, with sloping hood and radiator mounted behind the motor. Charles H. Stevens will remain superintendent of the factory, and L. A. Schertzar designer and engineer.

Another "35 Per Cent." Contract in Court.

Because of it appearance as a defendant in a suit which has been docketed on file in the Supreme Court for New York County, the Atlas Rubber Co., of Buffalo, N. Y., has been revealed as another of the many who were unable to resist the "monthly circular" bait dangled by the 35% Automobile Supply Co., of New York City. The "35 percenters" are suing for $1,900 which they claim is due on a contract which the Atlas Rubber Co. apparently presented before it was fulfilled. According to the complaint, the Atlas company agreed to supply the 35% company with credit to the amount of $3,360, in return for which the latter was to advertise Atlas goods in the monthly circular which it issues and which, according to reports, proved a gold mine. The plaintiff alleges that but $1,460 worth of the goods was delivered and, accordingly, it is suing for the remainder of its "pound of flesh." As a defense, the Atlas company sets up that it transferred the contract to the J. Elwood Lee Co., and therefore, has no further interest in the matter.

New Yorkers Father Ohio Parts Project.

Promoted by J. S. Harris, president of the Cockburn Mfg. Co., of Jersey City, N. J., and backed by New York capital, the Veitch Motor Co. has been formed in Dayton, O., and has secured a factory site in the Edgemont section of that city. It will engage in the manufacture of automobile parts, but ultimately will produce complete vehicles. The company, which is capitalized at $200,000, has not yet elected officers. It is stated that it will devote itself wholly to the manufacture of parts, which will be marketed by a separate company, while a holding company will hold the stock of both of the other companies. Pending the erection of a factory in Dayton, temporary quarters have been established in the Beaver Court Building in that city, where the necessary tools will be completed. Clarence Kramer, superintendent of the Cockburn Mfg. Co., and formerly a resident of Dayton, will be superintendent of the Veitch company, which is expected to begin active operations about September 1st of this year.

Tire Case Patents Taken to Court.

Hopewell Bros., of Newton, Mass., have instituted suit in the federal court in Boston against the Linscott Supply Co., of that city, for infringement of patents covering the Hopewell spiral spring tire case. The patents involved are Nos. 859,215, dated May 21, 1907, and 881,411, dated March 10, 1908.

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BACHMAN DELIVERS A "MESSAGE"

It's Intended for "Saving Bank Depositors and Others"—It Concerns Richness of De Schaum's "Colony."

O. B. Bachman, "formerly of New York City, and well known as an organizer of corporate enterprises," has become interested in the Suburban Motor Car Co., of Detroit. In fact, he has become its secretary and, apparently bringing to bear the talents which he acquired in organizing other corporate enterprises—but which cannot readily be identified—he is appealing to "savings bank depositors—and others"; the "others" including all of those persons who are in receipt of "a modest rate of interest for conservative investments, or who have lost money through injudicious investments." Bachman says he has a "message" for such people, or rather "for a limited number of them."

The "message" which he has softly whispered into their ears through the medium of an advertisement is to the effect that the purchase of stock in the Suburban Motor Car Co. may yield such huge returns that savings bank interest may appear a raindrop by comparison. In his "message," Bachman says that he has "absolute proof" that "20 to 30 per cent. and more" is not only possible but may be relied on; but as "profitable automobile investments have paid dividends from 60 to 1,000 per cent. per year," the suggestion is plain that there is no telling what Suburban stock ultimately may net its gloating possessors.

The Suburban Motor Car Co. grew out of the brain of William Andrew De Schaum, who has promoted "corporate enterprises" in other places, and of which some of those engaged in them have more or less pointed memories. As De Schaum is a prolific smoker of cigarettes, the Suburban enterprise was to be the crystalization of his life's dream—the zenith of all his enterprises. De Schaum claims to have built a car in 1895 and to have competed in the first automobile race in this country; also he claims to have originated the spark plug and several other things of moment.

As stated in the Motor World of March 11th last he enlisted the support of the mayor of Bad Axe, Mich., and made him president of his Suburban company, and securing an option on certain real estate in Ecorse, which is next door to Detroit, he painted a picture of an automobile manufacturing colony such as made all other such pictures turn white. The "colony" was to include a model factory, workmen's model homes, a model park, a model athletic field, a model swimming pool and all that sort of thing. Indeed, the "corporate enterprise" was to be so great that it was stated that Ecorse would change its name to Suburban City, while the model factory itself would turn out the Suburban Limited car, which in turn would make the world sit up and grow envious. A drawing of the factory and of the car are in evidence, apparently as "a guarantee of good faith."

The company actually was incorporated with capital stock of $500,000, of which $60,300 was paid in, the $300 representing the cash investment; the remainder was represented by 23 acres of land in Ecorse.

Apparently the promotion of such a gorgeous corporate enterprise was too great for William Andrew De Schaum, even with the assistance of the mayor of Bad Axe, and they called to their aid the former New Yorker who, it is declared, is "well known as an organizer of corporate enterprises." Then came the sending of the "message" to "savings bank depositors—and others." Apparently, Bachman wrote the "message;" but despite the fact, the savings banks of Detroit have not reported a wild rush to withdraw deposits.

Out of Rassel, DeArnold Lays New Plans.

W. DeArnold, who has been identified with the Rassel Motor Car Co., of Toledo, O., and who has been seeking to bring about the formation of a larger company for the purpose of manufacturing trucks, of which the Rassel establishment would be a part, has withdrawn from the latter and is proceeding to the formation of another and entirely separate corporation, which will be styled the DeArnold Mfg. Co. He states that he has "given up all hopes of acquiring the Rassel plant on a basis that would justify the expectations of the stockholders in the old company."

Probable Prices of Two New "Sixes."

What will be the prices of the new and large crop of six-cylinder cars which is in prospect is one of the subjects of keen interest to the trade at large, but concerning which little definite information is obtainable. Of the new "sixes," however, it is understood that the Hudson will be priced between $2,200 and $2,500, and the Warren between $2,000 and $2,200.

Death Claims Pioneer Body Builder.

George W. Moore, president of the Moore & Munger Co., of New York, manufacturers of automobile bodies, died of pneumonia on Friday last, 24th inst., at his home in New York City. Moore, who was a pioneer in the high grade automobile body industry, was 63 years of age.

Seeks to Puncture Indiana Tire Filler.

Although it was incorporated only last month, Charles B. Haines has asked that a receiver be appointed for the Indiana Tire Filler Co., of Indianapolis. The company owes him the large sum of $15 and he alleges that it is in danger of insolvency.

Herreshoff Adds $200,000 to Capital.

The Herreshoff Motor Co., of Detroit, has increased its capital stock from $230,000 to $430,000. Of the increase, $30,000 is represented by preferred stock.

KAUFMANS MUST MAKE DEFENSE

Michigan Court Holds They Cannot Escape Serious Charges of De Luxe Stockholder—Echo of Detroit Frenzy.

Chickens hatched in Detroit when the automobile frenzy in that city was at its height came home to roost last week in the Michigan Supreme Court when the case of Roswell R. Robinson vs. De Luxe Motor Car Co., et al., was decided in favor of the complainant.

The case came before the court on an appeal from an order of the Wayne Circuit Court, in chancery, overruling a demurrer filed by the defense. The suit was one of several of the same general character, involving a number of defunct companies, which have occupied the attention of Michigan Courts, the plaintiff charging that he had been induced to purchase stock by fraudulent representations.

Robinson, it appears, was the owner of 250 shares of DeLuxe stock, for which he paid $25,000. Although doing business in Michigan, the company was a New Jersey corporation, and Robinson alleges that he was induced to purchase his stock on the representations of Nathan M. Kaufman, its president, and Daniel W. Kaufman, its general manager. Its capital stock was $1,000,000, of which Nathan M. Kaufman had subscribed $525,000, for which he proposed to pay in part by transferring the assets of the C. H. Blomstrom Motor Car Co., which then was his property. Robinson charges, however, that Kaufman never paid for his stock, or executed a transfer of the Blomstrom assets and that he still owes the company upwards of $300,000 on his subscription. The Kaufmans control the board of directors and, according to Robinson's allegations, it was because of "Loose, extravagant and ill-advised management and the failure of Nathan M. Kaufman to pay his subscription that the company lacked sufficient working capital and was obliged to suspend operations."

Robinson further charges that in March, 1909, the Kaufmans organized the DeLuxe Motor Co., of Michigan, under the laws of that state, and transferred to it not only the Blomstrom assets, except its real estate, but all of the assets of the New Jersey DeLuxe company, the transfers being accomplished by means of foreclosure of a chattel mortgage claimed to have been given by these companies to Nathan M. Kaufman. The plaintiff, however, alleges that the mortgage never was legally authorized by the company and that if it ever were given "it was in fraud of the rights of the New Jersey corporation and was part of a scheme to control the assets thereof." It is further charged that since the transfer of its assets to the Michigan company the Kaufmans have sold, or agreed to sell, to another automobile company, a majority of

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the stock of the Michigan company, together with certain Detroit real estate, which should have been transferred to the New Jersey corporation as part payment of Nathan Kaufman's subscription.

As the Kaufmans dominate the board of directors, Robinson states that he can obtain no relief in that direction and that he has no adequate remedy at law; hence his suit in equity. He asks that the Kaufmans be compelled to account for their management and disposition of the patents of the New Jersey DeLuxe company, and that they be required to pay thereto all moneys which they have acquired or transferred to the DeLuxe Motor Co. of Michigan, "or which have been lost or wasted by their violation of their duties as officers and directors." He also asks that the "pretended transfer" of the property be set aside, and that a receiver be appointed for the New Jersey company with power to collect all unpaid subscriptions to its capital stock.

The defendants demurred to the complaint on the grounds that Robinson had not applied to the company for relief, that his complaint is clearly multifarious and that he has a full, adequate and complete remedy at law.

The court, however, as stated, overruled the demurrer and in sustaining the action of the court below the supreme court says:

"1st. Ordinarily the wrongs to a corporation must be redressed by corporate action. A Court of Equity will, however, entertain jurisdiction, to redress them at the suit of a stockholder when it is made to appear that he has made an effort to have the board of directors act and they have neglected or refused to do so (Talbot vs. Scripps, 31 Mich., 268) and in cases where the directors or those in control are guilty of the wrongs against the corporation, the stockholder is excused from making any effort to induce the board of directors to act on the theory that the offending parties would be unlikely to start proceedings against themselves. (Miner vs. Ice Co., 93 Mich., 97; Flynn vs. Third National Bank, 122 Mich., 642; Torrey vs. Toledo Portland Cement Co., 150 Mich., 86.)

"The question presented for our consideration is whether the allegations of the bill are such as to confine the course of the proceedings to the general rule or bring them within the exception. The bill charges that the defendants, Kaufman, were directors; that they held a majority of the voting power of the company and dominated and controlled the board of directors. All the acts of mal-administration and fraud are charged to them officially. These charges are of such a character as to make it unlikely that had a demand been made, it would have been complied with. If the law were to compel complainant to make a demand in the presence of such allegations, it would certainly require him to do an idle thing.

"2nd. It is urged that complainant is not entitled to equitable relief because he has an adequate remedy at law. The bill appears to be framed upon the theory of redressing wrongs done to the corporation. True, complainant introduces the grievances of the company to the Court by reciting one to himself, but his grievance is not carried beyond the first paragraph of the bill. Where the bill recites wrongs done to the corporation by its directors or officers, and corporate relief only is invoked, it is a proper case for a Court of Equity. (C. L. 1897, Sec. 9759.)

"3rd. The point is made that the bill is multifarious. We think the sole purpose of the bill is to reinvest the corporation with its property and assets, which it has been unlawfully deprived of by a series of wrongful acts of commission and omission committed by the defendants Kaufman as officers and directors of the company. All of the acts for which relief is sought are for wrongs done to the corporation, and the defendants Kaufman are charged with the commission of them. We see nothing in the way of disposing of the controversy in one suit."

Changes Among Prominent Tradesmen.

W. E. Armour has been appointed assistant sales manager for the Henderson Motor Car Co., of Indianapolis. At one time, he was a member of the Overland staff, but latterly, and for several years, he has served as district manager for the Marion Sales Co.

E. H. Bull has been appointed northwestern sales manager for the Franklin Automobile Co., of Syraruse. Bull previously was a division sales manager for the New York Leather Belting Co. He will be stationed in Denver, Colo., where he will take up his duties on June 15th.

W. B. Hurlburt, who has served as manager of the Packard and Thomas branches in New York, has been appointed sales manager for the Bergdoll Motor Car Co., of Philadelphia. Hurlburt left New York about a year ago and took charge of the Pennsylvania Auto Motor Co., of Bryn Mawr, Pa., but the company was in such a condition that his efforts proved vain.

Brandt New England Supervisor.

Ernest H. Brandt, of the headquarters' staff of the United States Motor Co., has been appointed supervisor of that company's New England district, which carries with it his removal from New York to Boston. Brandt succeeds F. J. Tyler, who has retired. Lucius Tyler, who had charge of the Maxwell branch in Boston, also has "passed out," the vacancy thus created being filled by the promotion of Ralph Coburn, who heretofore has had charge of the Stoddard-Dayton department but who hereafter will be manager of the United States Motor's Boston branch. A. W. Mutty succeeds Coburn.

Yellow Taxicab Swallows Another Rival.

Having purchased the taxicab business of the New York Transportation Co., and absorbed the Connecticut Co., the Yellow Taxicab Co., of New York City, has also taken over the Cab & Taxi Co., which before its failure and subsequent reorganization was one of the biggest cab operators in New York City. The several acquirements explain the Yellow Taxicab Co.'s increase of capital to $5,000,000.

Stoddard Repudiates Speedwell Report.

Despite published statements to the effect that C. G. Stoddard and H. J. Edwards are negotiating with the Speedwell Motor Car Co., of Dayton, O.—their former home town—with a view to joining its organization instead of forming the projected company of their own, there is absolutely no foundation for the rumor, according to Stoddard, who declared to a Motor World man that the reports were unauthorized and unfounded. When seen on Tuesday, he stated that there is nothing in the reports, though he afterward tempered the statement by adding that while he had had several consultations with an official of the Speedwell Motor Car Co. the chances were at least 50 to 1 that nothing ever would come of them.

Two Ohio Truck Makers Become One.

The Cleveland Motor Truck Co., of Cleveland, Ohio, and the Howard Automobile Co., of Galion, in the same state, both of which have manufactured trucks on a limited scale, have amalgamated under the title Cleveland-Galion Truck Co., which is capitalized at $500,000. Harry W. Woodward, president of the Cleveland company, is the head of the new corporation, which will retain offices in Cleveland and perform its operations in Galion.

"Auto Association" Sued for Tire Bill.

The so-called Auto Association, which did business in a downtown office building in New York, and which seemed to be contained in the person of one Frank Griffith, is the defendant in an action now on the calendar of the Supreme Court for New York County brought by the Ajax-Grieb Rubber Co., of New York. The suit involves an unpaid bill for tires, which originally was for $400, is now about $50.

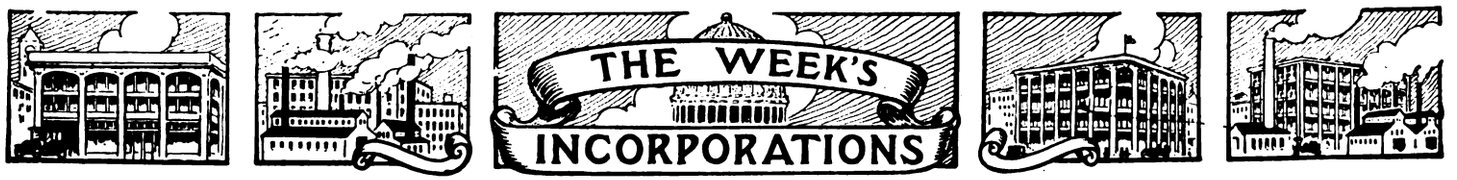
Effort to Revive Kansas Company Fails.

Charles Southworth, the Topeka, Kans., engraver who several months ago purchased the bankrupt plant of the Smith Automobile Co. in that city and who sought to organize a stock company to continue the manufacture of motor cars, has thrown up his hands and has abandoned the effort. The plant now is offered for sale.

Forming Company to Market Iowa Trucks.

William M. Simpson, of Chicago, Ill., and James K. Risk, of Lafayette, Ind., are reported to be organizing what will be styled the Universal Motor Truck Co., which will market the output of the J. W. Parsons Mfg. Co., of Newton, Ia. The Universal company, it is stated, will be capitalized at $500,000.

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South Buffalo, N. Y.—Garage Co., under New York laws, with $10,000 capital; to operate a garage.

Barberton, Ohio.—Todd & Courtney Co., under Ohio laws, with $10,000 capital; to deal in motor cars.

Dallas, Tex.—Fisk Co. of Texas, under Texas laws, with $25,000 capital; to deal in motor cars and supplies.

Detroit, Mich.—Jolls Motor Truck Co., under Michigan laws, with $20,000 capital; to manufacture motor trucks.

New York; rubber tire manufacturers; capital, $45,000,000; certified in Indiana for $714,286; B. G. Work, president.

Akron, Ohio.—Akron Motor Washer Co., under Ohio laws, with $10,000 capital; to manufacture automobile washing machines. Corporators—John Bauer and others.

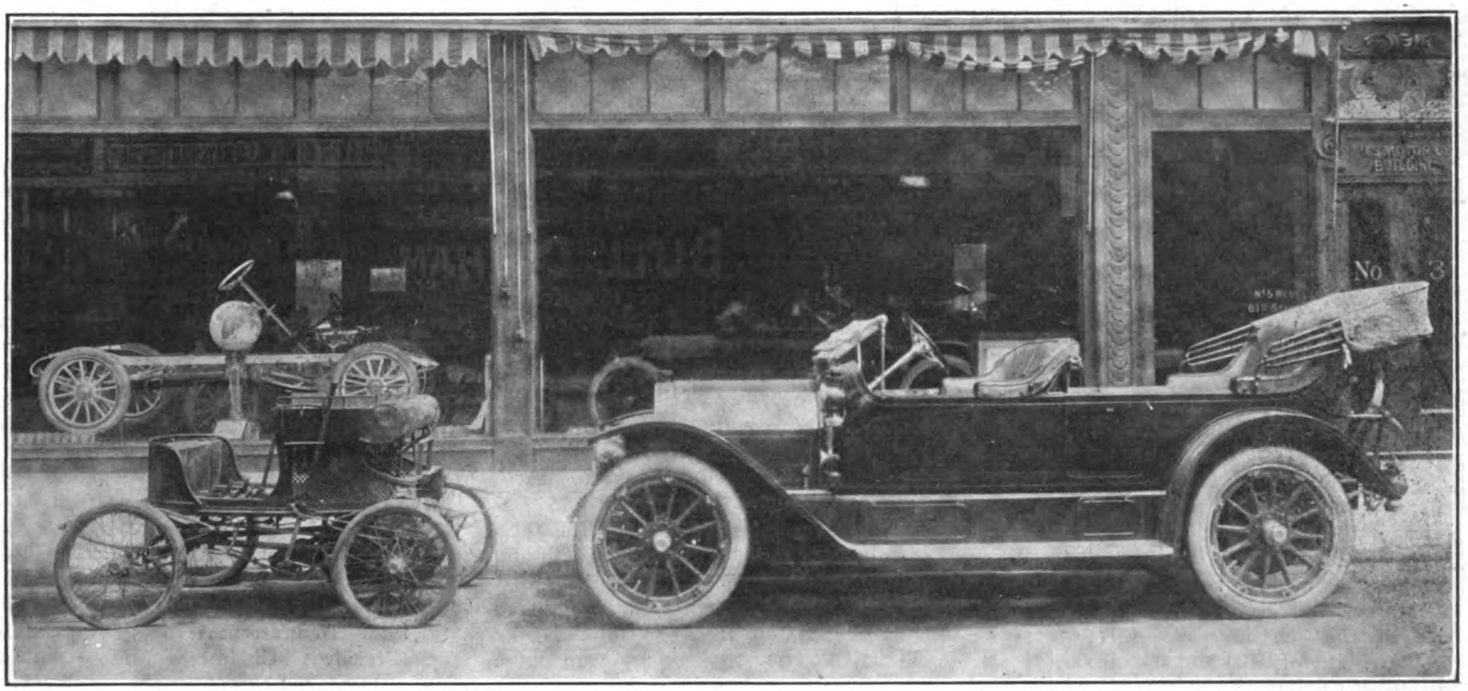
Louisville, Ky.—Stanley Automobile Co., under Kentucky laws, with $10,000 capital; to deal in motor cars. Corporators—E. C. Walker, George H. Laib, W. B. Young.

Herkimer, N. Y.—Rowalko Garage Co.,

Asheville, N. C.—Carolina Electric Vehicle Co., under North Carolina laws, with $25,000 capital; to deal in automobiles. Corporators—George S. Powell, W. T. Weaver, W. E. Reid.

Indianapolis, Ind.—Automobile Resilient Tire Filler Co., under Indiana laws, with $10,000 capital; to manufacture tire filler. Corporators—W. H. Disher, A. C. Balfour, Jessie Moffat.

New York, N. Y.—Acton Tire Repair Co., under New York laws, with $2,000 capital;



CONTRASTS: THE TWO-CYLINDER COLUMBIA OF 1895 AND THE COLUMBIA-KNIGHT "FOUR" OF 1912

Wilmington, Del.—L. F. Shepard & Co., under Delaware laws, with $200,000 capital; to deal in and rent automobiles.

Lynchburg, Va.—W. J. Merchant Automobile Agency, under Virginia laws, with $5,000 capital; to deal in motor cars.

Jersey City, N. J.—Unique Vulcanizing Co., under New Jersey laws, with $50,000 capital; to conduct a general automobile business.

Houston, Tex.—Twyford Automobile and Manufacturing Co., under Texas laws, with $400,000 capital; to manufacture automobiles.

Cleveland, Ohio.—Cleveland-Galion Motor Truck Co., under Ohio laws, with $50,000 capital; to manufacture and deal in motor trucks.

Indianapolis, Ind.—B. F. Goodrich Co., under New York laws, with $4,000 capital; to operate a garage. Corporators—William E. Rouse, Jr., William J. Wairad, Gersham Smith.

St. Paul, Minn.—White Bear Automobile Co., under Minnesota laws, with $25,000 capital; to deal in motor cars. Corporators—A. J. Diamond, O. Albrecht, J. C. Larson.

Baltimore, Md.—Detroiter-Baltimore Co., under Maryland laws, with $50,000 capital; to deal in motor cars. Corporators—R. H. Croxton, F. Howard Smith, G. A. Jarman, and others.

Pittsburgh, Pa.—Lytle Auto Supply Co., under Pennsylvania laws, with $50,000 capital; to deal in motor requisites. Corporators—W. C. Coffin, E. N. Ohl, E. J. Taylor, and others.

to repair tires, etc. Corporators—Patrick Curry, William Koopman, Lawrence Kerringan, all of 759 7th avenue.

Indianapolis, Ind.—Nesom Motors Co., under Indiana laws, with $200,000 capital; to manufacture motor vehicles. Corporators—C. T. Nesom, F. B. Brown, Louis Sagalowsky, J. A. Moriarity.

Pittsburgh, Pa.—Pitt Motor Truck Co., under Pennsylvania laws, with $200,000 capital; to manufacture motor trucks. Corporators—J. E. Douglass, E. P. Douglass, W. S. Phillips, F. O. Brant, J. E. McCalmont.

New York, N. Y.—Brooklyn Delivery Co., under New York laws, with $2,000 capital; to operate a motor delivery. Corporators—Maurice A. Lynch, 109 West 82nd street; Charles E. McMahon, 103 St. Markes Place,

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New Brighton, N. Y.; Eugene S. Lucas, 318 93rd street, Brooklyn.

Alexandria, Va.—American Pneumatic Starter Co., under Virginia laws, with $150,000 capital; to manufacture automobile motor starters. Corporators—C. A. Douglas, G. L. Baker and A. E. L. Leckie, of Washington, D. C.

New York, N. Y.—Ball Bearing Novelty Co., under New York laws, with $6,000 capital; to manufacture devices for automobiles, etc. Corporators—Alexander B. Greenberg, 874 Longwood avenue; Alfred Pioneer, 35 West 116th street; Jacob Solomon, 60 Montgomery street.

White Must Pay $871.25 for Body.

Merits of a body furnished the White Co., makers of White cars, by the Manhattan Top & Body Co., were the basis of argument in an action which was argued this week in the New York City Court wherein the Manhattan company, asking $855.50 and interest, was awarded $871.25. The defandant claimed the body was useless and that it should be awarded $1,430 damages and be relieved from paying the costs of the action. The body in question was of the town car type and was to have cost $850. The plaintiff claimed it delivered the body December 29, 1911, and fully performed its part of the contract. The defense was that when the body was received at the White factory in Cleveland, O., the doors and windows rattled, the body was not properly mounted, that it lacked proper mudguards, had no side curtains and was improperly painted, and was so generally unsatisfactory that after it had been tested several times and sent back for alterations the prospective purchaser cancelled his order. Besides the price of the body the Manhattan company asked $5.50 for labor performed. The White company claimed it has cost it $10 a month to store the body, also that it lost the sale of the chassis which was damaged to the extent of $400 and that it otherwise sustained damage to the amount of $1,000. The jury nevertheless found for the body builders.

Three More Additions to Overland Plant.

Apparently enlargement of the Willys-Overland plant in Toledo never will cease. Although a large extension has been little more than completed, building permits just have been issued for the erection of three additional buildings—a three-story concrete structure, 92 x 162 feet, a one-story brick building, 68 x 82 feet, and a one-story concrete building, 41 x 33 feet.

Ohio Forms Four Distributing Companies.

To facilitate the marketing of the output of Ohio cars, the Ohio Motor Car Co., of Cincinnati, has organized four companies, each bearing the title Ohio Motor Car Distributing Co., one each in Illinois, Pennsylvania, New York and Massachusetts. Each is capitalized at $200,000 and is controlled by the parent company in Cincinnati.

"U. S. RUBBER'S" HUGE EARNINGS

Defending Proposed Increase of Capital, Its President Brings Figures to Bear—Enormous Surplus.

Justifying the proposed increase of its capital from $50,000,000 to $120,000,000, Samuel P. Colt, president of the United States Rubber Co.—which owns the United States Tire Co.—in a communication to the stockholders has made public the greatness of its earnings and the surplus which it has on hand.

"For the last fiscal year, after payment of all interest charges," he says, "the entire net earnings of the United States Rubber Co. and of its subsidiaries (to the extent of the company's interest therein) were $6,711,331. The amount paid for dividends during the last year, including three quarterly dividends on the common stock, was $4,550,000, which, had four quarterly dividends been paid on the common stock would have been increased to $4,800,000. This sum, therefore, was almost $2,000,000 less than the company's earnings.

"On April 1, 1912, the surplus of the United States Rubber Co. and its direct subsidiaries was $9,175,729, and on January 1, 1912, the further surplus of the Rubber Goods Manufacturing Co. (of which the United States Rubber Co. owned substantially all of the common stock and more than three-quarters of the preferred) was $8,260,877. Accordingly, upon the basis of last year's earnings, and disregarding the expectation of increased business and earnings, there would appear to be adequate assurance of earnings to provide full dividends after the issue of the new stock; and upon the basis of surplus it appears that there is ample justification for a dividend upon the common stock so long as the same shall not constitute a drain upon the cash resources of the company.

"It is to be observed that the common stockholders are entitled to consideration in view of the fact that the greater part of these surpluses have been accumulated during the years in which dividends have been suspended on their stock. These considerations indicate the propriety not only of the issue of such common stock by way of dividend, but also of the fairness of offering it to the holders of the common stock, who under the charter are entitled to all dividends payable out of surplus after payment of full dividends upon the two preferred stocks."

Atlantic Truck Absorbs Machine Works.

The Atlantic Vehicle Co., which was incorporated with $390,000 capital under New Jersey laws last March, at which time the formation and business plans of the company were noted in the Motor World, has absorbed the Royal Machine Co., of Newark, N. J. The absorption is by way of completing the manufacturing facilities of the Atlantic Vehicle Co., which thus acquires a factory well equipped with modern machinery which will be used in producing the line of electric commercial vehicles which just have been placed on the market. The factory organization of the erstwhile Royal Machine Co. will remain practically intact, it is stated.

London to Stage an "Overflow" Show.

Olympia building having been found too small to meet the demands of those who desire to exhibit at London's annual show, the Society of Motor Manufacturers and Traders, which promotes the Olympia exhibit, has found it necessary to lease Agricultural Hall, where the overflow of the exhibits will be housed. Although the New York show also will be staged in two buildings, about one mile apart, Olympia Building and Agricultural Hall are so far removed from each other that instead of running concurrently, as will be the case with the American show, the Agricultural Hall exhibit will not be opened until six days after the Olympia show has been closed. The latter will occur November 8th to 16th, inclusive, while the Agricultural Hall affair will occupy the dates November 22nd to 30th, inclusive. No duplication of exhibits will be permitted, but the prospect of two shows is not being hailed with undivided enthusiasm. Incidentally, and for the first time, the Londoners are seriously considering the employment of a uniform plan of decoration. Several designs already have been submitted, but none as yet has been approved.

Chalmers Declares 2½ Per Cent. Dividend.

The Chalmers Motor Co., of Detroit, last week declared a dividend of 2½ per cent. on its capital stock of $3,000,000. The distribution is equivalent to a semi-annual dividend, being the third payment since January, 1911. In his report to the stockholders, President Chalmers, among other things, remarked that "for the fiscal year, the company's business shows an increase of 43 per cent."

Fears Takes Over Kastrup's Business.

William A. Fears, who previously was connected with the Chase Motor Sales Co. in that city, has taken over the business of H. Kastrup, at Rosalie street and Fair avenue, St. Louis, Mo., which hereafter will be operated as the Fears Auto and Engine Co. He will manufacture motors under the Kastrup patents and conduct a general repair and accessory business along conservative lines.

Woodworth Treads Now on Ground Floor.

The New York branch of the Leather Tire Goods Co., manufacturers of the Woodworth tread, has been removed from an upstairs office at 1777 Broadway to a ground floor salesroom at 1608 Broadway. Fred Blumenfield remains manager of the establishment.

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Davis & Stolt are building a garage in Corsica, S. D.

Henry Furnseth is to build a garage in Brandt, S. D.

Elmer L. Fuller has opened a garage in Hartland, Me.

V. W. Prime has opened a garage in Westport, N. Y.

Stone & Cornwall, Turtle Lake, Wis., are building a repair shop.

Gus McMilin has opened a new garage in New Richmond, Ind.

Frank Fisk is building a 100 x 60 foot garage in Newark, N. Y.

Fred Hill is erecting a corrugated iron garage in Caldwell, Tex.

J. E. Parker has engaged in the garage business in Mitchell, Neb.

J. L. Sanborn and E. R. Durgin are building a garage in Wolfboro, N. H.

Max Gundlach, Jr., is making ready to erect a garage in Bakersfield, Cal.

H. D. Clark has bought the Hannon & Grothe garage in Welthill, Neb.

Murray Schermerhorn is making ready to construct a garage in Chatfield, Minn.

Robert H. Corbett, of Livingston, Cal., is about to open a garage in that city.

John Maddux has sold his interest in the Taft (Cal.) Garage to George Wilson.

Harry DeBey has purchased the garage business of George May in Downs, Kan.

Rayno Bros. & Reid are building a garage on Northern Boulevard, Albany, N. Y.

Loeffler & Edwards, Delmont, S. D., are constructing a garage; it will be 44 x 50 feet.

R. L. Bewley has commenced the erection of a garage in Taft, Cal.; it will be 25 x 125 feet.

D. B. Acomb is about to erect a garage, 100 x 50 feet, on Ossian street, Buffalo, N. Y.

A. C. St. John is to build a two-story garage in Chehalis, Wash., at a cost of $10,000.

Ray Baldrige, Braddock, Pa., is building a garage and also will deal in automobile supplies.

Harley Hershberger will be the proprietor of a garage now being erected at Spickard, Mo.

J. C. French is to be the proprietor of a garage which is being built in Kingfield, Me.

The Winnipeg Garage, Ltd., of Winnipeg, Man., is to erect a $40,000 garage in Edmonton, Alta.

F. W. Decker, of Kendallville, Ind., has purchased the Aldrich Brothers' garage in Butler, Ind.

Frank Cooper, Cavalier, N. D., has sold his garage to R. S. Campbell, of Minneapolis, Minn.

H. E. Smith has opened an automobile repair shop at DeViller and Romana streets, Pensacola, Fla.

J. M. Frink has commenced the construction of a garage in Wellsville, Kan. It will be 28 x 60 feet.

R. S. Withers, Jackson, Miss., has sold his garage business to W. A. Chichester and J. S. Yerger.

The J. A. Powelson garage in Texhoma, Okla., has been purchased by J. J. Spence and W. A. Dulaney.

R. L. Crawford and N. F. Hancock have organized a company in Fayetteville, Tenn., to handle Ford cars.

Elmer Johnson, proprietor of the Soledad (Cal.) Garage, has admitted his brother Alfred to partnership.

W. L. Robinson & Son are about to build a garage, 80 x 30 feet, at Hill street and Corliss avenue, Greenwich, N. Y.

Charles H. Hildreth, Worcester, Mass., has purchased a site at 6 Sever street, on which he will construct a garage.

P. Rinzel is about to erect a garage and machine shop at 370-72 Grove street, Milwaukee, Wis. It will cost $12,000.

John B. Maynard has opened a vulcanizing and automobile repair establishment on North Main street, Bristol, Conn.

Richter & Cook's automobile business in Cuero, Tex., has been purchased by the Texas Motor Car and Supply Co.

Pepin & Mouso, liverymen, in Plattsburgh, N. Y., have branched into the automobile business and opened a garage.

Fred C. and L. McKenney have purchased the Fowler Garage in Gilroy, Cal.; they have renamed it the South End Garage.

Harry L. Alexander, in Norfolk, Va., has purchased a site on Water street, near Queen, on which he will erect a garage.

William A. Martin has bought the site, 53-55 West 124th street, New York city, on which he will build a six-story garage.

W. T. Sanger & Co. have been granted authority to erect a garage at Farwell street and Belleview place, Milwaukee, Wis.

Bjorke & Christiansen, Ambrose, N. D., have leased and will operate the garage formerly conducted by August Engstrand.

Henry Smith, Grand Rapids, Mich., has secured a permit to build a two-story brick garage on Ottawa avenue. It will cost $8,000.

William R. Vosburgh, Saranac Lake, N. Y., has opened an automobile repair shop and vulcanizing business at 22 Main street.

Under the style, Alling Garage Co., F. B. Alling has opened for business in New Haven, Conn.; he is located at 480 Whalley avenue.

The Bronson Auto Co. has been organized to conduct a garage and livery business in Bronson, Minn. S. O. Olson is manager.

Casa del Rey is the title that will be applied to a garage now under construction at Westbrook and Third streets, Santa Cruz, Cal.

The Acme Rubber Co., of Trenton, N. J., has opened a branch office in Chicago at 1475 Michigan avenue. Robert J. White is in charge.

E. C. Hall, Brockton, Mass., is having a combination garage and livery stable built on Winifred road. The building will be 67 x 36 feet.

J. M. Toney, Washington, D. C., has disposed of his interest in the Washington Auto Supply Co. to E. M. Van Ness and M. R. Muller.

Caldwell & Richards have purchased property in Long Beach, Cal., at 246 Locust avenue, upon which they will build a fireproof garage.

The Reece & Tuley garage, Effingham, Kan., after being idle for a year, has been leased by Walter Bell, of Achison, who will reopen it.

The Pasadena Motor Car Co. has commenced business in Pasadena, Cal., at 38-40 East Union street. Is is handling the Studebaker line.

Oscar Redfield, T. Bollman, L. C. Halferty and W. S. Helm have formed the Yale Auto Co. in Cashmere, Wash., and will operate a garage.

Thomas J. Swortfiguer, N. McAllister and E. Van Ness are about to build a two-story garage and salesrooms in San Francisco, Cal., to cost $20,000.

Craig Brothers is the name assumed by a new firm organized in Oklahoma City to handle Ferromatic tires. It is quartered at 706 North Broadway.

W. A. Swain has purchased an interest in the automobile business of Simpson & Son, Gridley, Cal. The style hereafter will be Gridley Garage Co.

Frank Hardar has placed contracts for the construction of a two-story garage in Philadelphia, Pa., at 2126-30 Market street. It will be 66 x 125 feet.

Arthur L. Cameron and Charles Werling,

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Sault Ste. Marie, Mich., have embarked in the automobile business. They will handle Brush and Courier cars.

Charles H. Bliss and Albert T. Rhodes are to embark as garage proprietors in Worcester, Mass. They are preparing to build on Berwick street.

F. V. O. Van Vechten and K. J. Reams, of Wausau, Wis., have formed a partnership for the purpose of operating a garage. They will erect a one-story steel and brick building, 120 x 120 feet, at Third and McIndoe streets.

Eber N. Street has disposed of his interest in the Valley Garage, Pomona, Ca., and Milton W. Zanders, the other owner, has admitted Ernest Whipp to partnership. The new firm will combine its garage business with the Stoddard-Dayton agency.

E. H. Bush, formerly proprietor of a carriage and wagon repair shop in Springfield, Ohio, has taken Otto Holland as a partner and, under the style Bush & Holland, will handle automobiles and do repair work. The Detroit motor wagon will be carried.

The Goodyear Tire & Rubber Co. has taken possession of its new branch at 436 South Warren street, Syracuse, N. Y. The new building is 20 x 160 feet and contains a storeroom with a capacity for 500 tires. The branch remains in charge of H. H. Mundy.

To operate an automobile transportation line between Reidsville, Wentworth, Leaksville and Spray, N. C., the Auto Transportaton Co. has been formed, with John C. Morrison, of Reidsville, as president, and W. S. Windsor as secretary and treasurer.

The Salt Lake Automobile Co., the Franklin dealer, has leased the quarters until now occupied by the Sharman Automobile Co., 162-66 East First South street, Salt Lake City. S. H. Sharman, of the Sharman company, will find other quarters for his Cadillac agency.

With capital of $50,000, the Maine Motor Car Co. has been organized in Portland, Me., to succeed the Maine Motor Carriage Co. The transfer of business will finally be effected November 1. The officers are: President, A. H. Hinds; vice-president and general manager, George A. Wagg.

Stutz Motor Car Co. is the style of a concern which just has been formed in Hartford, Conn., to handle Stutz cars in Hartford, Tolland and Middlesex counties. The company is composed of D. C. Lull, W. W. Howe and C. F. Yetter. Quarters will be at 341 Trumbull street.

The Jackson Motor Car Co.'s garage at Iowa avenue and Fourth street, Muscatine, Ia., has been purchased by J. H. Grimm, of Grimm & Warner, operators of the Pearl City Garage, 225 West Second street. Grimm will transfer his business to the new location and will retain his agency for Imperial and Krit cars. The Jackson company will continue as dealer in Cabillac and Hupmobile cars.

The Waverley Co., of Indianapolis, has purchased and taken over the garage and business of the Meridian Auto Co., of 724-730 No. Meridian street, in Indianapolis, which hereafter will be conducted in the Waverley Co.'s own name, making a speciality of Waverley electrics, of course. The stock of gasolene accessories carried by the Meridian company now is being disposed of at nominal prices.

Neracher Made Willys's Engineering Head.

Carl A. Neracher, who recently resigned as chief engineer of the Garford Co. to join the Willys-Overland Co., has been appointed the Willys consulting engineer, not only for the Overland factory but for all other Willys properties. Neracher will make his headquarters at the Toledo factory, where the various engineering departments will be centered, leaving only a working force of subordinate engineers at the factories proper. Fred I. Tone, the designer of the American and the Marion cars, is chief engineer of the Overland plant at Toledo and will remain its resident engineer, while F. Biszantz will continue as resident engineer of the Gramm Motor Truck Company. Neracher will succeed B. A. Gramm as the representative of the Gramm company in the National Association of Automobile Manufacturers.

Prest-O-Lite Files Suits in West.

Suits were begun last week in United States District Court in the West by the Prest-O-Lite Co. against alleged infringers of patents covering the complaining company's tanks and generators. C. D. Hoover, of Wichita, Kan., is the only one of the group charged with supplying generators for the tanks. The other defendants, who are accused of refilling tanks are: George T. Beard, Wichita, Kan.; Joseph Fisher, trading as the Houston (Tex.) Autogas Co., and the Colorado Autogas Co., of which the firm members are John R. Haws, W. H. Shideler and John and Thomas Moynahan.

Recent Losses by Fire.

Providence, R. I.—Kendall garage, Broad street, interior ruined, seven cars damaged. Loss, $25,000.

Baltimore, Md.—Neelly & Ensor, garage, Mount Royal avenue and McMechen street, damaged. Loss, unknown.

Cleveland, O.—Firestone Tire & Rubber Co., Euclid avenue, damaged. Loss, $75,000. Grabowsky Power Wagon Co., same address, damaged. Loss, $10,000. Jackson Motor Car Co., same address, garage and 30 cars damaged. Loss, $30,000. Total loss, $115,000.

Gramm Forming Another Truck Company.

Having relinquished office and all save a small stock interest in the Gramm Motor Truck Co., of Lima, Ohio, the control of which recently was ac quired by John N. Willys, B. A. Gramm now is engaged in organizing another company which will engage in the manufacture of commercial vehicles. While he is seeking to obtain a former strawboard factory in Lima, exactly where his plant will be located, or what will be the design of the truck, other than that it will be a highly standardized article, has not yet been made public. Reports that Gramm would again operate under his own name are, however, not likely to prove true, inasmuch as the name Gramm is copyrighted and is the property of the company which already bears his name.

Goodrich Reduces Ohio Capitalization.

Having transferred its corporate existence from Ohio to New York, the B. F. Goodrich Co. has reduced its capital stock in the former State from $20,000,000 to $200,000. The New York corporation, as already is generally known, is capitalized at $45,000,000, which amount, in view of the Goodrich company's recent purchase of the Diamond Rubber Co., shortly will be increased to $90,000,000.

Jury Passes on a Tire Guarantee.

Because he did not obtain the 3,500 miles of travel which he alleged had been guaranteed, a Toledo (O.) jury, on Saturday last awarded O. S. Brumback, an attorney of that city, the full amount, $49.50, for which he had brought suit against the Michelin Tire Co. Two tires were involved, and the case is interesting chiefly as showing jurymen's opinion of tire guarantees.

Washington Widens Garage Regulations.

Despite the protest of property owners, the commissioners for the District of Columbia, have approved an alteration of the building regulations whereby public garages may be maintained on squares in the residential district already occupied by similar establishments. The new regulation was proposed by the building inspector of the District.

Winding Up Pontiac Wheel Company.

By order of the court, the stock on hand of the Pontiac Wheel Co., of Pontiac, Mich., which went into bankruptcy several weeks since, will be offered for sale. The real estate and factory buildings will be disposed of later.

Youse Purchases Crescent Body Works.

The E. S. Youse Co., of Reading, Pa., has purchased the Crescent Body Works, at 144 Rose street, in that city, which formerly were owned by Samuel Gehret. Gehret will remain in the new owner's service.

Indiana's Assets Purchased by Millikan.

By order of the court, the assets of the Indiana Motor Mfg. Co., which had a small plant in Franklin, Ind., have been sold by the receiver to Frank M. Millikan. He paid $20,000 for the property.

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THE MOTOR WORLD

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NEW YORK, MAY 30, 1912

FOR SIMPLIFIED IGNITION SYSTEMS.

In the process of eliminating the troubles that beset the earlier types of gasolene motors, it would seem that while some evils have been entirely removed, others, more persistent, have survived, though greatly mitigated, while those things which originally gave the most trouble still do so. The ignition system, infinitely superior to what it was not very many years ago, still is credited with causing at least 90 per cent. of motor troubles.

Ignition systems have been vastly improved, and it is not readily apparent where any further radical improvement can be made along the lines at present being followed. The tendency, however, seems toward complexity rather than simplicity, and the average chauffeur is by no means qualified to dissect his spark-producing mechanism, though he may not hesitate to go through any other part of his car in search of trouble. And the fact that it is considered necessary, in even the best cars, to provide two complete systems of ignition apparatus, is in itself a tacit admission that the best in existence leaves something to be desired. A carburetter manufacturer who recommended the use of an extra carburetter, piped up ready for use, as a stand-by, would be in a fair way to lose his reputation as a maker of reliable carburetters.

All this adds point to the question: Is it not possible that the makers of ignition apparatus are on the wrong track, in that they should turn their attention to the production of appliances of such simplicity that the average driver could handle his ignition system with the same confidence and with the same facility that he handles everything else on the car? Is it not possible that there is a field yet untouched and which holds promise of radical discovery? Of course, they are not easy of answer, but as improvement still is the order of the age, the questions are fair ones.

CONCERNING SPEED LIMITS FOR LARGE CITIES.

Having hoaxed President Taft himself into accepting a trade mark as a club emblem, it is not strange that the commercial Touring Club of America should have been able to induce the New York Board of Aldermen to accept seriously its desire to assist in forming a model ordinance for the big city. It is well, however, that the aldermen did not depend wholly on the professions or suggestions of the so-called club, and that instead of enacting one of those wide-open laws which are disguised by the terms "careful and prudent" and "reasonable and proper," they are on the point of adopting one which fixes a speed limit of 15 miles per hour for the greater part of the city.

Whatever may be the case in the open country, to permit individual interpretation of what constitutes a careful or prudent speed in populous centers is an invitation to evils the extent and seriousness of which are not easily reckoned. In discussing such proposals, it is so customary to overlook one of the principal sources of danger as to give rise to wonder. For until human eyes are trained to see around corners, danger will lurk at every street intersection; and until that time arrives unbridled speed should not be countenanced. Even at the present rate of speed, it appears as if only the influence of Providence has been responsible for the escapes that have been so numerous at those points.

GASOLENE FACTS VS. GASOLENE FANCIES.

It is distinctly great to be endowed with that divine gift that permits intimate knowledge of nearly all businesses to be contained within a single head, and, without half trying, to be able, for instance, to arise and more or less unselfishly explain the advance of 56 per cent. in the price of gasolene better even than those who are able to explain it. Unfortunately, talk of by-products and their effects cannot offset the fact that there is no evidence, visible or obtainable, that within the last six months the supply of gasolene, or of crude petroleum itself, has diminished, or that the demand for it increased to an extent even mildly approximating 56 per cent. And when the responsible and controlling agent continues to pay enormous profits on an enormous capitalization, men not blest with the divine gift are apt to accept that fact at its face value and to hold fast to the beliefs that reference to by-products and supply and demand is merely polite conversation, and that the opportunity to "get more of that automobile money" has been too strong to be resisted.

"Crooks Drive Many Taxicabs," is the startling heading which appears in a New York newspaper, which at considerable length elaborates the assertion and quotes a police official as saying that because of the crooks, "taxicabs are not very safe for women." To be perfectly fair, however, it should have been added that crooks drive many horse vehicles and that not a few of those who operate taxicabs are "nighthawks" who formerly had to do with horse cabs. As it is easily possible to recognize the reputably-owned taxicab, the drivers of which usually are bonded, anyone who selects a "nighthawker" is largely to blame.

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INGENUITY THAT MET EMERGENCY

Being an Illuminating Tale That Demonstrates Shop Possibilities—Varied Work Performed by One Motor.

"Who ever heard of a motor truck concern making a delivery ahead of time?" growled the Delivery Superintendent, making vicious jabs with a blue pencil at a letter in his hand. "The garage is about finished, but it's as dark as the inside of a cherry-colored cow, and the juice isn't turned on. And here's the boss saying the machine'll be here today and she's to go to work tomorrow. That means night work to fix up the body, too."

"The electric light wirin's all in" remarked the new garage foreman, musingly. "All the tools 're there. All we want is the juice—" He broke off suddenly, and then grinned. "Say, have you got the catalogue of that machine?"

"No," grunted the Del. Supe, as they called him for short. "Billy's got it upstairs. What for d'ye want it?"

But the foreman had disappeared. In five minutes he was back, with a pleased look on his face.

"All right, boss," he said. "Let 'er come. I'll guarantee to have the juice there an' plenty of light to work with. The Big Boss 'll have the machine workin' bright an' early the next mornin'."

"Like Kelly will," the Del. Supe vouchsafed, skeptically. "Well, I don't care what you do, as long as you get the car out. You'll do that?"

"Sure. Come round to the garage about seven or eight o'clock an' see what's doin'. I'll show you somethin'." And the foreman went his way chuckling.

His curiosity aroused, the Del. Supe went around by the garage on his way home that evening. Approaching, he was surprised, even though he had a certain amount of faith in the foreman, to see the place ablaze with light. The engine of the new car was running steadily. Gaining admission by the simple process of kicking on the locked door until it was opened from within, he glanced around. All the lights were burning brightly; the lathe over at the end of the garage was running briskly, driven by a little electric motor, and a man was using an electric breast drill on the frame of the car.

"Plenty of juice, all right," commented the Del. Supe. "How'd you get it turned on?"

"Didn't," said the foreman.

"Well, what's the answer?"

"That's easy, boss. The machine's an electric, only instead of a storage battery she's got a generatin' plant—a gasolene motor on' dynamo—to make the juice, so there ain't no batteries to be charged. I just looks up the catalogue to find out what was the voltage of the dynamo, an' it says you can make it anything you like by regulatin' the speed of the motor. So when the truck gets here I unhooks the wires from the dynamo to the car motors an' hooks them up to the electric light wires. The Edison man left them all nice an' handy to connect up. Then I starts up me engine an' opens up the throttle until she's goin' fast enough to grind out the juice to light up nice and bright, an' there you are! When the drill an' the lathe's both runnin' together I open up the throttle a little an' when they're both off, shut down a little. Easy!" And the foreman grinned a grin of sheer professional delight.

"Well, I'll be d—d!" ejaculated the Del. Supe, his habitual expression of worry dissolving momentarily. "You've got the truck lighting the garage, turning the lathe and running the drill that's making holes in its own frame! Well, I'll—say, that's not so bad." And he departed, satisfied that the new foreman was on the job.

To "Keep Tabs" on "Nighthawks."

In an endeavor to suppress the crooks and "nighthawks" who operate taxicabs and other rental vehicles, or at any rate to "keep tabs" on their comings and goings, Alderman Dowling yesterday introduced into the New York Board of Aldermen the following ordinance:

Section 1. A public garage is hereby defined as a place in which space is rented to, or in which are stored, motor vehicles of any kind whatever to be let for hire at any time.

Sec. 2. It shall be the duty of each and every keeper of a public garage to record in a book kept solely for such purpose the time of departure from such garage of every motor vehicle kept for hire, giving the names and addresses of the owner and driver thereof, the name and class of vehicle, the license number of the driver and the license number of the vehicle, and the time of the return to the garage of each such vehicle shall also be entered in said book.

Sec. 3. Said record book shall be open for inspection at all times to the representatives of the Police Department and the Bureau of Licenses of the Mayor's Office.

Sec. 4 provides a fine of $10 for the first violation by either the "keeper or acting keeper of a public garage," and $25 for the second violation, or imprisonment at the rate of $1 per day in default of payment of fines.

Where Franklin Gains Have Been Made.

According to the records of the Franklin Automobile Co., of Syracuse, N. Y., in which record keeping has been developed to a high art, the Franklin sales in ten cities—Boston, Philadelphia, St. Paul, Providence, Cincinnati, Cleveland, Buffalo, New York and San Francisco—are to date 150 per cent. greater than were the sales for the entire fiscal year of 1911, the Franklin year ending with August. Cincinnati shows the greater proportionate increase, 500 per cent., Boston representing the other end with 86 per cent. The average for twelve of the leading cities is 105 per cent. Much of the increase is attributed by the Franklin people to their "no yearly model policy," which was adopted by this company about a year ago.



May 30, Indianapolis, Ind.—Five hundred miles International Sweepstakes race on the speedway.

May 30, Salem, N. H.—Rockingham Park track races.

May 30, Bridgeton, N. J.—Track Races under the auspices of the South Jersey Motor Club.

May 30, Danbury, Conn.—Hill climb under the auspices of the Automobile Club of Danbury.

May 30, Washington, D. C.—Mixed track meet under the auspices of the National Capital Motorcycle Club.

May 30, Scranton, Pa.—Track races under the auspices of H. B. Andrews.

June 6-7, Chicago, Ill.—Inter-Club reliability run under the auspices of the Chicago Motor Club and the Illinois Athletic Club.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 11-13, Washington, D. C.—Automobile Club of Washington's second annual reliability tour for pleasure cars.

June 15, Cincinnati, Ohio—Cincinnati Automobile Dealers' Association's annual hill climb on Stanley avenue hill.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 23-29, Laurel, Md.—Track races promoted by R. E. Shadel.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

August 26-31, Chicago, Ill.—Chicago Automobile Trade Association's first outdoor show.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

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ALL IN READINESS FOR FIVE-CENTURY GRIND

Those Who Will Participate in the Second Annual International Sweepstakes Race on the Indianapolis Speedway for $50,000 in Prizes — Preparations That Make Probable the Shattering of Ray Harroun's Record — Influence the Weather May Have on the Winner's Average Speed.



ZENGEL, STUTZ



WILCOX, NATIONAL



BRUCE-BROWN, NATIONAL



DE PALMA, MMERCEDES

THE 27 ENTRANTS AND SPECIFICATIONS OF CARS THEY WILL DRIVE

No. Driver	Relief	Car	Entrant	Cyl.	Bore	Stroke	Disp.	Tires	Magneto
1—Gil Anderson	Knipper	Stutz	Ideal Motor Car Co.	4	4¾	5½	390	Michelin	Splitdorf
2—Len Zengel	Knipper	Stutz	Ideal Motor Car Co.	4	4¾	5½	390	Michelin	Splitdorf
3—Teddy Tetzlaff	Bragg	Fiat	E. E. Hewlett	4	127 mm.	190 mm.	589	Miller	Bosch
4—Ralph De Palma	None	Mercedes	Ralph De Palma	4	131 mm.	180 mm.	583	Michelin	Bosch
5—Louis Disbrow	Hearne	Case	J. I. Case T. M. Co.	6	4⅜	5	450	Michelin	Remy
6—Harvey Herrick	Hearne	Case	J. I. Case T. M. Co.	6	4⅜	5	450	Michelin	Remy
7—Spencer Wishart	None	Mercedes	Spencer Wishart	4	130 mm.	180 mm.	583	Michelin	Bosch
8—Joe Dawson	Herr	National	National Motor Vehicle Co.	4	5	7½	589	———	———
9—Howard Wilcox	Rader	National	National Motor Vehicle Co.	4	4⅞	6	448	———	———
10—Harry Knight	Johnson	Lexington	Lexington Motor Car Co.	6	4⅛	5¼	422	Michelin	Remy
12—Bert Dingley	Swanson	Simplex	Bert Dingley	4	5¾	5¾	597	Michelin	Bosch
14—John Jenkins	Fuller	White	White Indianapolis Co.	6	4¼	5¾	489	Michelin	Bosch
15 Robert Burman	None	Cutting	Clark-Carter Auto. Co.	4	4 7/32	7	597	Firestone	———
16—Lee Frayer	Reader	Firestone-Columbus	Columbus Buggy Co.	4	5	5½	431	Firestone	Connecticut
17—Wm. Liesaw	Farr	Marquette-Buick	Will Thompson	4	6	5¼	594	———	———
18—Wm. Endicott	H. Endicott	Schacht	Schacht Motor Car Co.	4	4¾	5½	389	Michelin	Remy
19—Ralph Mulford	None	Knox	Ralph Mulford	6	4.8	5.5	597	Michelin	Bosch
21—Hughie Hughes	Kittrell	Mercer	Mercer Auto. Co.	4	4⅜	5	300	Michelin	Bosch
22—Joe Horan	Ainslie	Lozier	Dr. W. H. Chambers	4	5⅜	6	544	———	Bosch
23—M. Marquette	Fowler	McFarlan	Speed Motors Co.	6	4¼	5	425	Michelin	Splitdorf
24—Len Ormsby	None	Opel	I. C. Stern and B. N. Noble	4	4½	6⅛	450	Michelin	Bosch
25—Joe Matson	None	Lozier	O. Applegate	4	5⅜	6	544	———	Bosch
26—Chas. Shambaugh	None	Shambaugh	Chas. Shambaugh	6	4½	5	467	———	———
27—Romineis	None	Continental	F. N. Martindale	4	4½	4½	286	Michelin	Remy
28—Chas. Merz	Knipper	Stutz	Ideal Motor Car Co.	6	4⅜	5½	585	Michelin	Splitdorf
29—David Bruce-Brown	Herr	National	National Motor Vehicle Co.	4	4⅞	6	448	———	Bosch
31—H. J. Kilpatrick	None	Mason	Mason Motor Co.	4	3 15/16	5	243	Michelin	Splitdorf

According to the present outlook, the laws of ratio and proportion that have served for many a year are due to sustain a severe jolt today, May 30th. No one knows exactly how many spectators viewed the first 500-mile International Sweepstakes race on the Indianapolis Speedway last year. Suffice it to say that it was a really tremendous crowd—a crowd that was quite commensurate with the importance of the event. And there were 40 cars to watch spinning dizzily around the big 2½ mile oval. This year there will be but 27, and it is because there are only 27 that mathematicians must needs revise their methods, for though 40 cars drew last year's crowd, and 27 cars might be expected to draw a smaller crowd, according to the way proportion is taught in the school books, common, ordinary methods are not applicable in this case. There is every reason to believe that the great, big, roomy grandstand and the bleachers and the fence rails will be even more crowded than they were last year, when Ray Harroun, in his yellow Marmon, shot over the line a winner and pulled down the richest plum that had been hung up in many a long day.

Following Harroun last year, Ralph Mulford, at the wheel of his milk-white Lozier, next shot over the line, barely a minute later. Bruce-Brown, at the wheel of a Fiat, was third, and the other nine drivers to finish "in the money," in the order in which they crossed the wire, were as follows: Spencer Wishart (Mercedes), Joe Dawson (Marmon), Ralph De Palma (Simplex), Charles Merz (National), W. Turner (Amplex), Fred Belcher (Knox), Harry Cobe (Jackson), Gil Anderson (Stutz) and Hughie Hughes (Mercer).

One of the reasons for the bright expectations of the promoters for a real record crowd is that by all the "dope" that can be brought to bear, Harroun's well-earned record ought to be beaten. That is, provided weather conditions are the same as they were for the 1911 race, when they were all that could be desired. A slight haze in the afternoon, when the drivers were getting a little tired and their eyes were commencing to feel "heavy" with the constant vigilance, was exactly the right condition to bring out the greatest possible speed.

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DAWSON, NATIONAL



MERZ, STUTZ



ENDICOTT, SCHACHT



HORAN, LOZIER

If it is very hot on Thursday, and according to the weather prophets torrid weather ought to come on in a rush, there is doubt whether the tires will stand up under the terrific strain. As was the case last year, the race is bound to be a battle of tires in a measure. Other things being equal, the driver who keeps the tires on his car the longest stands the best change of getting the checkered flag first—and the $20,000 that goes with it. That the track, even under the best conditions, is, as more than one driver has expressed it, "Hell on tires." was demonstrated in the first race, when, in the 10th mile, three drivers stopped at once with shoes literally ripped to ribbons. This year, with the speed greater and the track hotter, it remains to be seen whether even 10 miles can be covered before it becomes necessary to pull up at the "pits." The surface of the track is vitrified brick, and it is laid on a foundation of cement, a combination that for heat retaining qualities is hard to beat. And as it is the heat that is generated, or transmitted, to the tires from the track, that plays hob with them and causes them to burst, there are those who opine that if the sun shines brightly all day Ray Harroun is in no danger of losing his record.

It will be another story, most likely, if the day dawns cool and stays cool. It is that kind of a day that the drivers and nearly every one else are praying for, and if it comes to pass it is well-nigh certain that Harroun's average of 74.61 miles an hour will be eclipsed, and by a pretty good margin at that. The Speedway management has done everything in its power to shake the record down, and there are 27 eager hands stretched out to catch it. The surface of the track has been groomed and the fissures caused by the rigorous weather of winter closed up with cement. A large sum has been spent in "fixing" the track and the approaches. In several places where there was no cement retaining wall last year there is one now. Thus, for instance, the spot in front of the "pits" where Harry Knight last year drove his Westcott car into the tents to avoid running over the mechanician who was thrown out of a Case car, now is protected with a solid wall like that which lines nearly all of the rest of the course. Some of the money also went into a tunnel beneath the track and connecting the grandstand with the infield, though it will have little or nothing to do with the probable speed that will be made, for no one was allowed on the track after 8 o'clock last year. But it will relieve the congestion at the overhead bridges and the comfort of spectators will be increased. The tunnel is large enough to permit the passage of two automobiles at the same time and also provides two footpaths for pedestrians.

Another reason why a new record for the distance is expected, is because of the requirement that each car to be eligible must show a speed of at least 75 miles an hour for a complete lap of the track. Last year a speed of 75 miles an hour was sufficient, whether it was for a half mile, which was the minimum distance, or a mile or two miles. But this year it is different, and a car must be capable of making one complete lap of the track in not more than two minutes.

Already 26 of the drivers are out on the track "tuning up," and the times that have been made by the most of them make the two-minute limit look sick, to say the least. The best that has been done so far is credited to Ralph De Palma, who finished last year in sixth place at the wheel of a Simplex. This year De Palma is driving a big, gray Mercedes, that is a twin to the one Spencer Wishart will have, and in practice was clocked for a lap of the track in 1:44⅗, which is at the rate of 86 miles an hour. Wishart has the same Mercedes he had last year and is credited with having made some laps of the track that are just as fast. Robert Burman, whose name has been blazoned forth on nearly every fence in the country, has a monster Cutting car, with 597 cubic inches piston displacement, that is said to have carried him around the 2½ miles in 1:47, and though this is considerably slower than the time made by De Palma, it figures out at nearly 84 miles an hour, nevertheless. Disbrow, who last year drove his more or less famous Pope-Hartford "Hummer," but who now



FULLER, WHITE



DINGLEY, SIMPLEX



JENKINS, WHITE



MATSON, LOZIER

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LIESAW, MARQUETTE-BUICK



DISBROW, CASE



HUGHES, MERCER



ANDERSON, STUTZ

has a Case car with a fantastic body, zipped around in 1:55 and a fraction. Teddy Tetzlaff, whose latest triumph was the establishment in California of a new world's road record of 78.5 miles an hour, drove his big, red Fiat—the same one he drove to such good purpose at Santa Monica—around in 1:46; Joe Matson, in a Lozier, has negotiated the distance in 1:52; Charles Merz, with a Stutz, has made circuits under 1:55; Joe Jenkins, in the White "six," over which Barndollar made such a fuss, has covered the distance in 1:51, and incidentally set at rest the rumor whispered by some that the White car was not capable of the speed; and in fact nearly all of the drivers have consistently shown that to maintain a speed of 75 miles an hour for a lap of the track entails no particular hardship.

Of the 26 drivers who are entered, only seven are making their first appearance in a 500-mile race. These seven are Harvey Herrick, who has a Case mount, and who scarcely requires introduction to the army of racegoers, by reason of his performance at Santa Monica last year, when he hung up a record with a National; Bert Dingley, another old National pilot, who has forsaken his first love to handle a Simplex; Billy Liesaw, who will steer a Marquette-Buick; Joe Horan, who was prevented from driving a Lozier last year because of an eleventh-hour accident; Len Ormsby, who will have the German Opel "creation"; Charles Shambaugh, who has entered his own car, which is a reconstructed Buick racer with a couple of cylinders added, and H. J. Kilpatrick, who attracted more or less attention last year as the Hotchkiss pilot in E. A. Moross's racing "stable." The complete list of pilots, together with the particulars of the cars which they will drive, is as follows:

The race as a whole will be notable in many respects, and in one respect in particular. It will mark the re-entry, so to speak, of the wire wheel into American racing, for though in a few isolated cases cars have been seen in competition on American soil on wire wheels, this is the first time that so many wire wheel equipped cars have been entered in the same race. Five of the cars are equipped with detachable wire wheels, and the products of three manufacturers are represented among them. Both of the Case entries have them; Lee Frayer's Firestone-Columbus has McCue wheels; Ormsby's Opel is equipped with Booth demountabe wire wheels; and Hughie Hughes's Mercer is equipped with Rudge-Whitworth wheels.

Nor will fantastic body creations be lacking. The Continental entry probably is the most peculiar looking of the lot. It is equipped with a "stream line" body that is extreme and ends in a tail that suggests so much a fish that the car has been dubbed the Continental "shark." As usual, the Case cars are rigged out with cigar shaped bodies that suggest but little the conventional racing rig. As a matter of fact, it is altogether likely that they will be taken off before the cars finally line up, for it is said they are fairly heavy and it is expected that a weight reduction will assist materially the chances of the team. The largest car in the race is Burman's Cutting, which has a piston displacement of a little over 597 cubic inches. Inasmuch as 600 inches is the limit, it may be seen that there is very little to spare. At the other extreme Kilpatrick's little Mason car has the least piston displacement, the measurement being just 243 cubic inches. Though the car thus is very small, and it might appear that its chances are rather slim against some of the bigger cars, Kilpatrick bases his expectations on the light weight of the car and its consequent easiness on tires. Hughie Hughes's Mercer also is in the smaller class, though no doubts have been expressed as to its ability to hold its own with the best of them.

As a last and final inducement for the drivers to lower the record set up by Harroun, the prize list this year is just about double that which was raced for last year. Whereas Harroun drew down a mere $10,000—not to mention the "incidentals" which were offered by accessory manufacturers, and which bulged Harroun's pocketbook out still further—the winner this year will receive the modest sum of $20,000, and the "incidentals" as a matter



MARQUETTE, McFARLAN



KILPATRICK, MASON

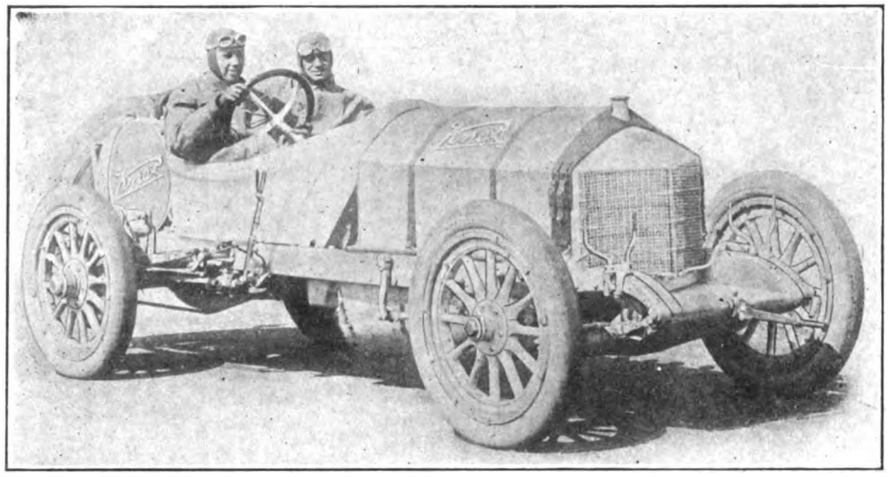


WISHART, MERCEDES



TETZLAFF, FIAT

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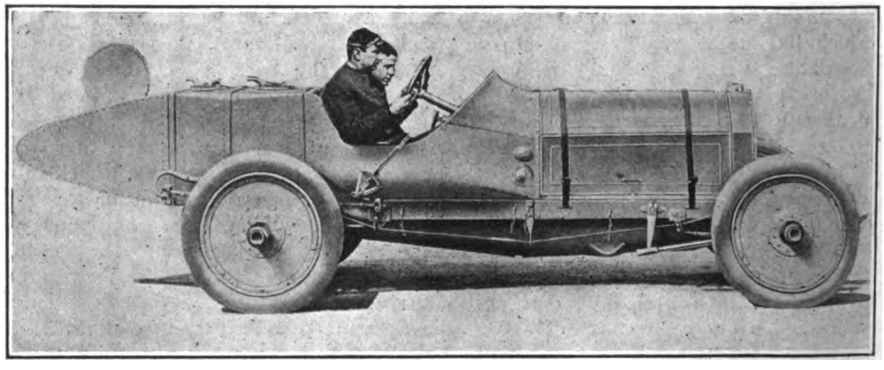
RALPH MULFORD AND HIS SIX-CYLINDER KNOX

of course. Also there are 12 "place" prizes this year instead of 10, the smallest prize being $1,000, and the other 10 between that and first being $1,100, $1,200, $1,300, $1,400, $1,500, $2,000, $2,500, $3,000, $5,000 and $10,000, respectively. The winner of second place this year thus draws as much as last year's winner. The total amount, not counting the individual prizes that have been offered by accessory manufacturers for the use of their products, is $50,000.

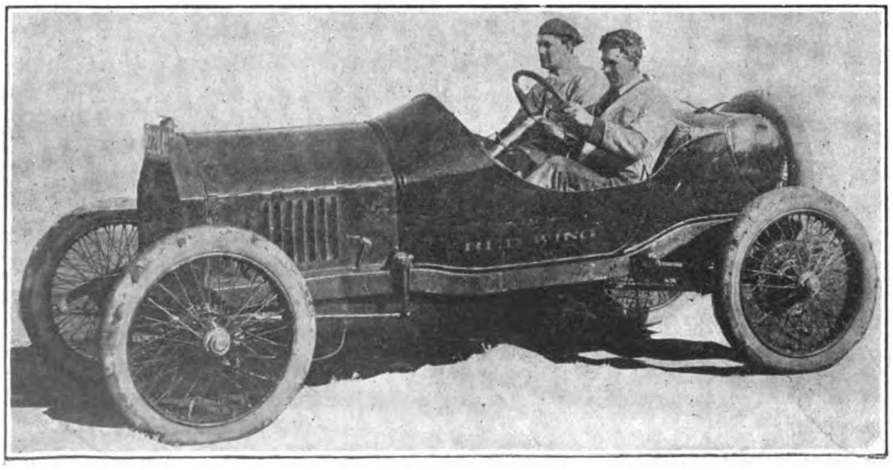
That board and lodging in Indianapolis will be at a premium goes without saying. Last year rooms could not be had for love or money, and meals required the most earnest ferreting. The owners of private homes are said to have reaped a harvest sheltering and feeding those who were unlucky enough—or lucky enough—to be turned away from the hotels, and this year the same preparations are being made to accommodate the crowds which will pour into the city from every quarter. All of the big railroads will run special "race" trains, and preparations are being made to treble and quadruple the trolley service from the city of Indianapolis, which is four miles distant from the Speedway, to the track. Several automobile clubs from nearby States and cities have made arrangements to tour to the track in bodies, though it scarcely is to be expected that even with all the automobiles that will be driven into the grounds the parking space will be taxed, for there is room for some 10,000 machines.

Though nothing has been said anent the method of starting the 27 cars, it is likely, in view of the success of the method used at the first race, that the procedure will be repeated. Briefly, it consisted of firing a series of bombs at one minute intervals up to the final starting signal, when all the drivers followed Carl G. Fisher in his car for a complete lap of the track, when they were free to "loop it out" to the best of their ability and the ability of their cars. Ten o'clock in the morning is the hour for which the start is scheduled.

Fisher is the president of the Speedway company and will take an active part in the proceedings on Decoration Day. R. P. Hooper, who is president of the American Automobile Association, is honorary referee and A. R. Pardington the referee. As usual, Fred. J. Wagner will start the drivers on the long grind, and he will have as his assistants Ray Harroun and E. J. McShane. The others who will take active part are as follows: Board of timers—C. H. Warner, Beloit, Wis.; O. C. Foster, Cleveland, Ohio; Harry Knepper, New York; Wm. Knight, Indianapolis. Director of scorers, John A. Cox, Terre Haute, Ind. Board of judges—Will H. Brown, Indianapolis; Thomas Hay, Chicago; J. J. Cole, Indianapolis; H. O. Smith, Indianapolis; J. W. Hayden, Indianapolis; J. M. Ward, Jr., Indianapolis; Howard Marmon, Indianapolis. Clerks of the course—Charles P. Root, Chicago; C. H. Wallerich, Indianapolis. Monday, 27th inst., was elimination day, and, giving indication of the speed that may be expected, Bruce-Brown drove his National mount around the track at the almost phenomenal speed of 88½ miles an hour, his time for the lap being 1:41.75. That he qualified goes without saying. Howard Wilcox, in another National, made the next best time, lapping the brick oval in 1:43.20, which is at the rate of 84 miles an hour. Of the others that turned out but two failed to get through on the first trial. The Mason entry, driven by Lee Oldfield, developed slight engine trouble and was forced to retire temporarily, and the Continental is said to have fractured a connecting rod.



BOB BURMAN IN THE POWERFUL CUTTING "FOUR"



LEE FRAYER AND THE WIRE-WHEELED FIRESTONE-COLUMBUS

Site Secured for Detroit Club House.

Detroit's eight-story $300,000 club house, which is to be erected by the Wolverine Automobile Club, will grace the northeast corner of Madison avenue and John R street. The site has been acquired by the organization at a cost of $110,000, and measures 100 x 150 feet. Since the original plans were drawn for a building on a plot 100 feet square, it is not unlikely they will be altered to utilize the added ground.

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A. A. A. TOUR TO START IN DETROIT

"Automobile Capital" Finally is Selected—October Dates Probable—Southern Floods Will Affect the Route.

Neither Indianapolis nor Chicago, each of which has been, spasmodically at least, more or less interested in securing the start of the 1912 A. A. A. National Reliability Tour, which is the successor to the historic Glidden Tour, will stage the start of the event, for Detroit, which never once has rested in its endeavors, has offered sufficient inducements, including the necessary bonus, to become the Northern terminus of the contest and has been definitely selected.

The choice of Detroit as the starting point of the eleventh annual tour, was due primarily to the activity on the part of members of both the Wolverine Automobile Club, the Detroit Chamber of Commerce, and the Detroit Automobile Dealers' Association. The necessary fund of $1,500 which was raised by the members of the three bodies came for the most part from automobile manufacturers located in the city, although no small portion was contributed by the Detroit Hotel Keepers' Association.

It is stated at the American Automobile Association, that although the course to be traversed through the northern States has not yet definitely been decided upon, it will in all probability lead through Indianapolis, and it is not at all unlikely that if such is the case the necessary arrangements will be made to make that city a night stop for the large cavalcade. Similar arrangements may be made to include Cleveland in the route, but as they would necessitate too great a detour, Cleveland probably will be omitted.

The course so far as is known will lead through Indiana, Kentucky and Tennessee to Memphis, the next of the "big" cities which will be touched. From Memphis an "as the crow flies" trail will be followed insofar as consistent with the condition of the roads, directly to New Orleans which is to be the southern terminus. In whatever condition, however, the roads are not likely to be soon forgotten by the participants.

Owing to the recent floods which have made automobiling well nigh impossible in Mississippi and Louisiana, save in sections remote from the river, no endeavor will be made to blaze a trail with a pathfinding car for several weeks to come, nevertheless, despite the obvious hardships which will be encountered in laying out the route for the "Lakes-to-Gulf" Tour, competition already is strong among those who would secure the honor.

Ten days, it is expected, will be necessary for the completion of the journey, and judging by the never ending mud wallows which it is expected will be encountered toward the end of the tour, the estimate is none too conservative. October 3 is set as the tentative date for the start of the tour, but if last year's procedure can be taken as a criterion, the starting schedule will undergo many revisions before a definite date is fixed.

While New Orleans is to be the actual terminus of the tour, arrangements are being made whereby those tourists who have not seen sufficient in the way of water and poor roads by the time New Orleans is reached may avail themselves of the opportunity afforded by comparative nearness of the canal zone, to pay a visit to the latter. The supplementary tour will traverse the new ocean to ocean highway which is being built across the Isthmus by the government, and which parallels the canal.

Peace and Proxies at A. C. A. Election.

Despite the great rumpus kicked up by the "insurgent" members of the Automobile Club of America, who took a vigorous stand against the adoption of the new by-laws that permit the free use of proxies, and the "commercialization" of the organization, the annual election of governors for the big club on Thursday last, 23rd inst., was conducted peaceably and without moment. Only 50 or 60 members of the 1,000 or more were present, and no less than 700 proxies were cast. As no opposing candidates were presented, the administration ticket, which is claimed to represent the Wall Street element which financed certain of the club's undertakings, was unanimously elected. It is as follows:

For term expiring in 1915—Colgate Hoyt, Dudley Olcott, 2d; Henry Sanderson, Edward Shearson; for term expiring in 1914—Oliver G. Jennings, William W. Miller, John J. Riker, W. K. Vanderbilt, Jr.; for term expiring in 1913—Henry B. Anderson, James A. Blair, Jr.; Alexander J. Hemphill, Hamilton F. Kean, William L. Rich. George S. Brewster was elected to serve out the term of the late Colonel John Jacob Astor, which will expire in 1913.

The following governors continue in office: For term ending in 1915—Henry Evans, Henry R. Taylor, Frederick D. Underwood; for term ending in 1914—George F. Baker, Jr.; E. H. Gary, Dave H. Morris; for term ending in 1913—General George Moore Smith.

The governors will elect the officers, but no date therefor has been set. As the right to vote for officers is one of the causes for which the insurgents "insurged," and as, when their fighting spirit ran high, they threatened to take the election into the courts, it remains to be seen whether they will carry out their threat.

The Waukesha (Wis.) Motor Club has elected George B. Harris president for the ensuing year. Henry E. Blair and A. L. Blackstone were chosen as vice-president and secretary-treasurer, respectively.

NEW YORK NOT TO BE "WIDE OPEN"

Aldermanic Committee Rejects Suggestion of Unlimited Speed—Will Increase Pace and Offer Drastic Penalties.

After having toured the city in motor cars and witnessed brake tests and otherwise studied the subject with uncommon intelligence, the committee of the New York Board of Aldermen which is seeking to evolve a "model" ordinance for the metropolis, has decided not to make it a "wide open" city, that is, one in which the unlimited, or "careful and prudent," speed permitted by the Callan law governing the State, will be rendered legal. Instead, it will propose a limit of 15 miles an hour in the residential and business sections and 20 and 25 miles, respectively, in other parts, instead of the eight mile rate which now prevails.

Other recommendations which will be made are far less palatable and reflect the effect of the "butting in" of that busy-body map selling corporation which mis-styles itself the Touring Club of America. Among other things, the new ordinance may require the stoppage of automobiles where street cars are stopped, and may subject owners as well as chauffeurs to fines, which are increased from $10 to $25, even for a first offense.

The recommendations of the committee are:

Maximum speed in residential and business districts, 15 miles per hour.

Maximum speed where houses are 150 feet apart, 20 miles per hour.

Maximum speed on roads known as country roads bounded by undeveloped property and farmhouses, 25 miles per hour. Speed in excess of this amount being prima facie evidence of reckless driving.

All cars to be stopped at crossings where passengers are entering or alighting from cars at a distance of six feet from the rear of the street car.

All cars to slow down to a reasonable speed in crossing any avenue or street where there is a street car track.

Private owner when riding as a passenger to be subject to the same penalties as a chauffeur; or possibly as an alternative, provide a penalty against the car regardless of the owner for being driven in violation of the ordinance.

For the first offense, a fine of not less than $25 and no more than $100, with the additional jail sentence, not to exceed 30 days, is provided. In its tentative report the committee also makes a number of suggestions regarding what it believes are necessary changes in the State law.

The clause relating to the holding owners guilty when they are merely passengers in the car has been tried out in other cities. Judges in Philadelphia and Chicago have ruled in this wise.

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MEN AND MOTORS IN RELAY CONTEST

Bicyclists, Motorcyclists and Automobilists Carry Message—Latter Deliver it First —Instructive Comparisons.

After a cessation of activities of three years, the first event of the kind having been run in 1909, the British Dunlop Tire Co. has promoted its second combination motor car, motorcycle and bicycle relay road race over the 1,149 miles of good, bad and indifferent roads between Adelaide and Sidney in Australia and the three motor cars that played the most prominent parts in the unusual struggle were American-made machines. it afforded an interesting comparison of the three modes of travel, and, not strange to say, the motor cars proved superior; they beat the motorcycles by 5 hours, 6 minutes, and the bicycles by nearly 23 hours.

The contest was styled a "relay military despatch ride," and as the appellation signifies, the contestants in the three divisions were required to carry a military despatch from one end to the other in the shortest space of time. Each division, the motor car drivers in one, the motorcyclists in another and the bicyclists in a third, was tendered the same despatch and it was relayed in competition across South Australia, Victoria and New South Wales in 15 relays varying in distance from 38 to 118 miles. Twelve motor cars, 52 motorcycles and 12 motor cars made up the respective divisions.

By a peculiar twist of circumstances, the first car to reach its destination—a Chalmers driven by Roy Sanford and M. Campbell—did not carry the despatch. It subsequently transpired that Messrs. Sanford and Campbell had previously turned the paper over to B. Scott and G. Heron who piloted a Flanders and whose leg of the relay was the last. Scott and Heron lost their way, however, and after having traveled some 60-odd miles off the track, eventually straightened out and ran into Sidney after having covered 434 miles in 15 hours 48 minutes. Sanford and Campbell had continued to Sidney after having completed their leg of the relay and deposited the paper with the drivers of the Flanders, however, and beat the latter in. Nor were these two American cars the only ones in the run. A. Wiseman and T. Bell, piloting a Maxwell, played a part that was so active that they are likely to remember it for some time to come. They were on one of the earlier relays and after an unusally hard mud plug rolled into Melbourne having completed their 69 miles from Ballarat in the middle of the night during a terrific rain storm.

The total time required by the motorists was 46 hours 44 minutes, which figures out at the rate of 24 2/3 miles an hour; the motorcyclists rode at the rate of 22⅕ miles an hour and required 51 hours 50 minutes to make the trip; and the bicyclists occupied 69 hours 32 minutes—an average speed of 16½ miles an hour. Although the roads remain soul-trying the time in each class was better than that of three years before.

Odd Prizes Add to Washington's Sociability.

Bearing what is more nearly the proper title for such affairs and undisguised by such a term as "roadability contest," 70 carloads of motorists enjoyably participated in the Washington (D. C.) Automobile Club's "Sociability run" on Saturday last, 25th inst. Not a little of the enjoyment was contributed by the nature of the prizes offered, which ranged from a loving cup, a bonnet, a cuff button and a cane to a meal ticket and a shower bath. The loving cup was won by Arthur Foraker, piloting a Marmon car, who made the best guess. The sealed time for the 22½ mile course to Cabin John's Bridge was 1:34:35. Foraker's guess was 15 seconds too slow. C. H. Orme, in an Apperson, and C. A. Bentley, in a Regal, both finished in 1:35·10 and, therefore, tied as the next best guessers. Several electric cars participated, but only one of them, a Hupp-Yeats coupe, completed the round trip. It was entered by its agents, Bare & Allen, and as its prize drew down five gallons of cylinder oil, which, of course, it can never use.

Chicago Considers Queer Legislation.

Because of numerous automobile accidents in the streets of Chicago the authorities of that city are endeavoring to so revise the traffic law in relation to automobiles that the danger to pedestrians will be lessened. Thus far final action has not been taken, but hearings are being held for the discussion of drafts of ordinances drawn up by a committee. One clause would forbid the use of switches and compel a driver to get out of the car to light and extinguish the tail lights, even if it be an electric lamp and controlled from the seat, while another prohibits anyone riding in front of the driver. Still another seeks to require drivers to stop their machines at least ten feet behind street cars that are stopped for the loading or unloading of passengers.

Would Repeal Washington's Wheel Tax.

Representative Johnson, Chairman of the House District Committee, has presented a bill in Congress which would repeal the wheel tax on automobiles in the District of Columbia. The enactment of the law would put an end to the long opposition to the tax, which, however, has been upheld by the District courts.

R. S. Shelden, of Houghton, Mich., has succeeded himself as president of the Cooper County Automobile Club. The other officers elected at the annual meeting are: Fred S. Eaton, Calumet, vice-president, and W. D. Calarley, Houghton, secretary-treasurer.

HORSES IN MOTOR TRUCK PARADE

They Were the "Guests" of the Occasion—Newark's Turnout Marked by Several Uncommonly Interesting Displays.

Influenced in so many things by its proximity to New York, Newark, N. J., which is separated from the big city by a river, a collection of houses and an expanse of marsh land, was the scene of a truck parade on Saturday last, 25th inst. It was promoted by the Newark Automobile Dealers' Association and in the language of the natives, it was "some" parade, too. It was witnessed by more people than witnessed the metropolitan parade but a few weeks ago, and as it was in some respects more picturesque it was, therefore, more interesting to look upon.

In all, 165 machines of varied types and three horses paraded, first through the business section of the city, whence they wended their way to Olympic Park, where they were parked for the inspection or entertainment of all who cared to see them at rest, or who had been invited to do so by the dealers' association.

Few of the better known trucks were missing from the line-up and, as is usually the case, most of them were privately owned, their owners making the most of the occasion by advertising their respective lines of trade—a builder of greenhouses displaying a life-size glass house in all its transparency, and a ceramic manufacturer displaying a full line of his picturesque wares.

Undoubtedly the most interesting showing was made by the Adams Express Co. It was of an historical nature and depicted four stages in the development of the package delivery system, covering the periods when parcels were delivered by a runner afoot, by a man with a pushcart, by horse-drawn vehicle and finally by an electric wagon.

The display made by the Auto School of New Jersey was full of action. In a workshop, which for the occasion was placed on a platform built on a Commer truck, students of the school were shown engaged in repairing tires, overhauling motors and performing other duties incident to their course of instruction in the school itself.

The three horses which participated in the parade were the guests of the occasion, so to speak. They did not work their passage. One of them was carried on a Mais truck which bore a suggestive placard, "My First Joyride," while the other two were passengers on a White truck which bore the sign, "Emancipation Day."

The Racine Motor Club has been formed in the Wisconsin city of that name, with these officers: president, Dr. A. Taylor; vice-president, A. J. Horlick; secretary-treasurer, Arthur Simonson.

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POWER-DRIVEN AIR PUMPS AS DESIRABLE ADJUNCTS

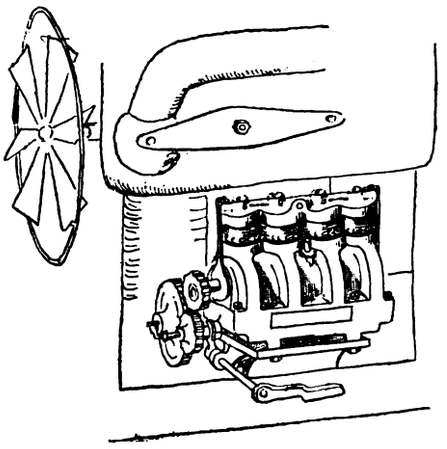
The Place the Engine-Operated Air Compressor Occupies With Regard to the Growing Tendency Toward More Complete Equipment and the Reason It Bears a Distinct Relation to the Reduction of Maintenance Expense—Construction and Arrangement of the Various Pumps in Use.

It is one of the signs of the times that the modern car as it comes from the factory is a complete car, "full equipment" in the true sense of the phrase having become the slogan of no inconsiderable number of manufacturers. The number of cars turned over to purchasers as complete—requiring nothing but gasolene and a driver—steadily is increasing and in the completeness of equipment that gradually is coming to pass, the power driven tire pump holds, or should hold, a place that is important, for it has been demonstrated that tires usually are the biggest item in a motorist's expense account no matter how small it may be and it is the maintenance of the proper pressure in tires at all times that makes for long life. Ergo: any device which encourages the maintenance of the proper pressure in the tires by reducing to the minimum the amount of labor necessary in obtaining the pressure, assumes an importance that is not to be gainsaid as it bears a direct relation to the cost of maintenace of the car.

Almost as long as automobiles have traveled the roads tire manufacturers have been hammering home the truth that plenty of air pressure—not too much, however, though it is seldom the average driver errs on the wrong side of the balance—is the only salvation of the owner. As it has been suggested before, if the tire manufacturers could be suspected of collusion to their own benefit in thus continually harping on the same old string "keep up the pressure" then the owner might well view the advice askance. The tire manufacturers do reap benefit, it is true, but it is a benefit to their reputation in that their products then "stand the gaff" better. But it is nothing to the actual money benefit which the owner reaps. Air is cheap and it would seem that owners are overlooking a good thing when they neglect to keep their tires pumped up to the limit advised by the manufacturers.

The principal reason they fail to do so, of course, is that the operation of a tire pump necessitates a certain amount of physical labor which is distasteful, for no one has any compunction about using the freest of Nature's gifts. And it is just here that the power driven air pump comes into its own, so to speak. On the face of it, every one knows that head work saves heel work, or words to that effect, and the use of a power driven pump constitutes head work. Similarly, no one requires to be told that certain kinds of work can be done by machinery more efficiently and with greater despatch than they can be done by manual labor; and the pumping of tires is one class of labor which may safely be included in this category.

According to the most advanced theory of the automobile, the engine should be made to do all the work. It should start the car and keep it running and stop it. In fact the operator should have nothing to do whatever, except possibly to steer the vehicle, though it is not too much to expect that the actual work of turning the road wheels may some day be done by the



STEVENS-DURYEA ARRANGEMENT

engine under the direction of the operator, the control being a couple of buttons under his fingers. Already, the engine has been harnessed to furnish the requisite light for night driving and it is entirely within the scheme of things that tire pumping, which really is hard work at its best, should be done by the engine. It is such a simple matter to attach a hose pipe to a tire valve, start the engine, turn a little lever and then watch a pressure gauge until the tire has its full quota of the "needful" that it would seem that the days of the hand pump surely are numbered. But despite the simplicity of existing types of power pumps and their durability and dependability the number of car manufacturers who supply them as stock equipment is limited to scarcely more than a baker's dozen.

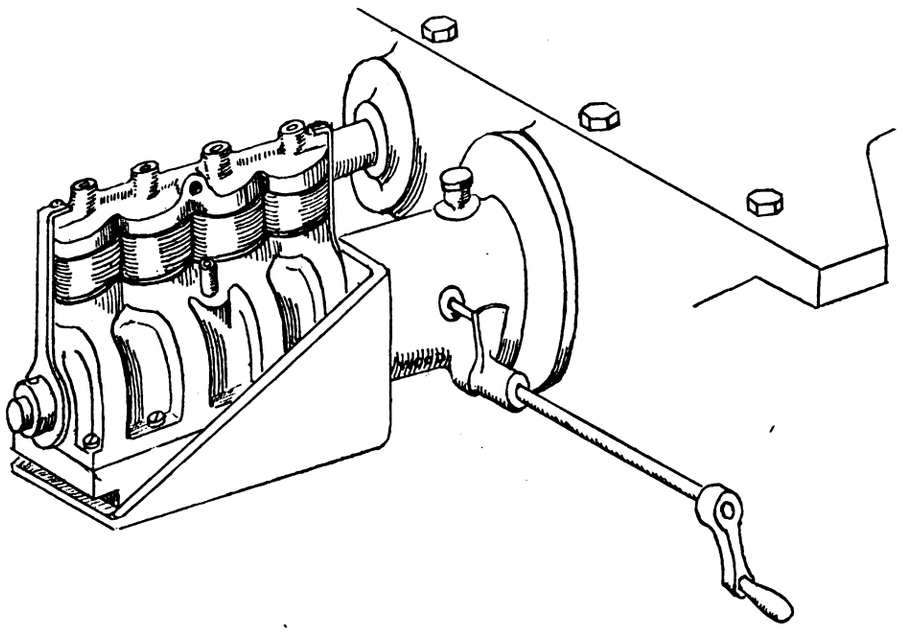
Of course there are any number of detachable power driven tire pumps, such, for instance, as the spark plug pump which is manufactured by the Brown Co., of Syracuse, N. Y., and the several makes of small friction driven devices which are designed to be operated from the engine flywheel. Some of them even are designed to be operated by friction from one of the driving wheels, the wheel first having been jacked up from the road. And though there might be some objection to the latter type of pump for the reason that its operation in rainy or muddy weather might entail more or less hardship a power pump of any kind is better than a hand pump. In the same way, it is possible to interject a hypothetical objection to the flywheel driven pumps on the ground that their positive action may be interfered with by the presence of oil on the flywheel. Still, they require but an infinitesimal part of the power of the engine and it is a comparatively simple matter to hold a piece of waste against the flywheel face until the friction is sufficient to allow the pump to perform its allotted work. At any rate, the work is easier than the work of pumping up a big tire with a hand pump—or rather a pump that makes necessary the use of nearly every muscle in the body.

With the spark plug pump, on the other hand, all such difficulties are overcome. A spark plug is unscrewed from any cylinder and the pump screwed into its place. Then, with the engine running on the remaining three cylinders the pump does the trick with no further attention. Such pumps do not, as might be supposed, force burned gas (which is not present) or fresh "mixture" into the tires. Instead, they force pure air into them and their modus operandi is as delightfully simple as could be wished for. In its simplest aspect, such a pump consists of but three parts if the hose for conveying the air is not considered a part. The three parts are an outer shell (1), which encloses a differential piston (2), and a check valve (3). As the movement of the check valve is very slight at best, it may be assumed that there is only one part that moves sufficiently to require lubrication, and that part is the piston. The piston is really a double piston, whence the appellation "differential" piston. Similarly, the outer casing is of two diameters, the larger part of the piston being at the bottom and fitting the larger part of the casing and the smaller parts of both, which form the pump proper, being at the top. In action, the pressure generated in the cylinder when the engine piston rises, exerts an upward pressure on the larger end of the pump piston which rises and compresses pure air, previously drawn into the upper portion of the pump, which then is forced into the tire. It is doubtful if a more simple device to be used

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for the same purpose could be evolved. Because the air pumping portion of the device is practically isolated from the rest of it, it is impossible for oil to be pumped into the tires.

To those manufacturers who equip their cars with compressed air or compressed gas engine starting devices the problem of providing means of quickly and easily inflating tires is easy of solution. It merely requires that a hose line be run from the air reservoir so that it may be attached to any of the tire valves. Unless great care is taken in designing such systems, however, there is danger that a certain amount of oil and moisture will be forced into the tires along with the air. The statement implies that the system is one in which the burned or exhaust gases are stored in a cylinder. When such is the case it is absolutely essential that the reservoir be fitted with a drain cock and that it be used frequently for the gases always contain a certain percentage of moisture which condenses immediately the gas enters the cold pipes and tank. Provided the tank is drained at regular intervals and the pipe line between the engine and the reservoir is of sufficient length to permit the gases to be cooled thoroughly before being stored the system is an excellent one.



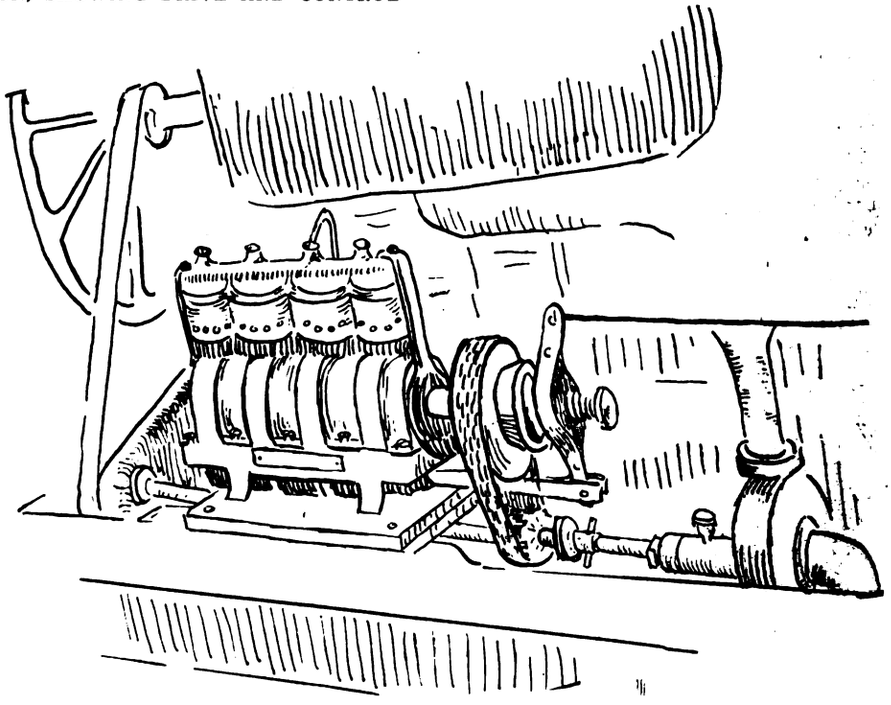
KELLOGG PUMP ON PEERLESS TRANSMISSION, SHOWING DRIVE AND CONTROL

Contrary to expectations which might perhaps be bred of an incomplete knowledge of the working of a compressed gas system, there is no danger of explosion whatsoever provided the system is properly designed and installed in the first place. Suffice it to say that those cars in which the compressed gas system of engine starting and tire inflating is used are manufactured under the supervision of experienced engineers and are perfect as it is possible to make them. The reason why no explosion is possible must be apparent after a brief survey of the construction and modus operandi of a typical system, such as is used in Chalmers cars, for instance.

Without reference to the engine starting portion, the system consists of a steel cylinder which is used in storing the gas, a couple of lengths of thin copper or brass tubing, a check-valve and a shut-off cock for controlling the flow of gas to the tire that may be under process of inflation. The check-valve, which is really the life of the system, is so arranged that its opening is very tiny. In fact it is scarcely more than 1/100th part of an inch. Consequently the actual amount of gas that passes through it almost is infinitesimal. The peculiar part of the valve, however, is that it becomes operative only when the charge in the cylinder to which it is attached is fired. In other words, the ordinary compression pressure is not sufficient to raise the valve off its seat and therefore it is impossible for "live" gas to enter the reservoir. Quite obviously, it follows that as no "live" gas can get into the reservoir it is impossible for an explosion to occur. As the amount of gas that is admitted to the reservoir each explosion is extremely small, the amount of power that is lost is so small as to be practically immeasurable.

But while all such systems are excellent in their way and undoubtedly reduce the labor attendant upon the operation of a car even as they reduce maintenance expense by encouraging that tires be inflated always to the proper pressure, it cannot be denied that they introduce a slight hazard of inoperativeness that is not present with the positively driven air compressor. Moreover it sometimes is difficult with other than positively driven devices to obtain service at the instant it is required. The criticism is not hypothetical in this case and the trouble really exists though it is of such infrequent occurrence that the net efficiency on the whole performance is only very slightly reduced. Nevertheless the hazard exists and in this respect the positively driven pump, though slightly more complicated, leads.

Of the several different makes of power air pumps which are designed to be placed on a car permanently it is doubtful if any is better known than the Kellogg, which is manufactured by the Kellogg Mfg. Co., Rochester, N. Y. If for no other reason than that it has been adopted as stock equipment on a number of cars of nation-wide reputation, among which are the Columbia, Stoddard-Dayton, Peerless, and



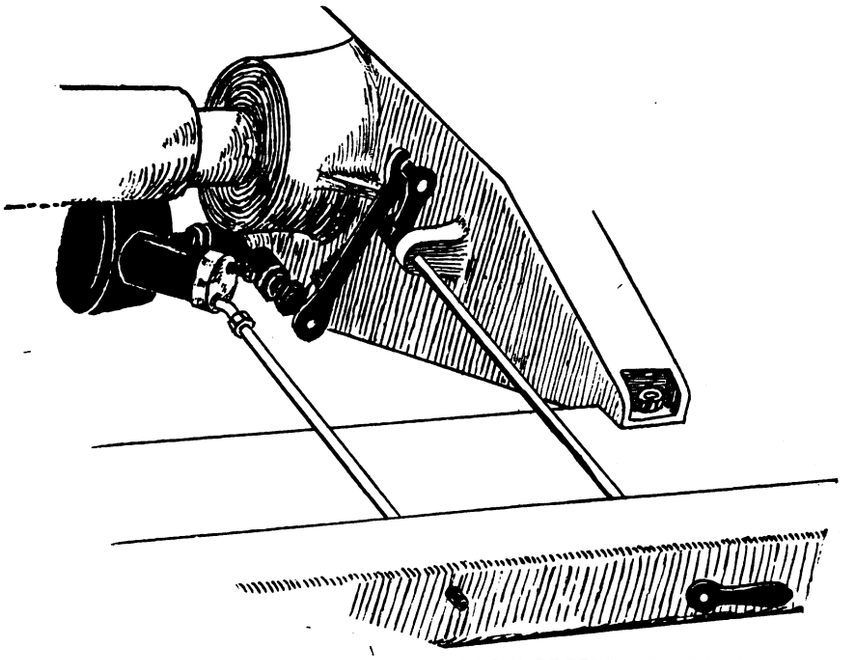
McFARLAN PUMP LOCATION AND METHOD OF DRIVE

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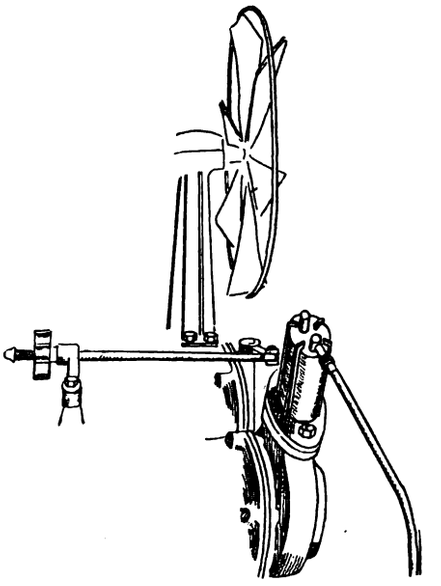
Stevens-Duryea, it scarcely requires introduction to the motoring public though its construction and method of operation may perhaps be shrouded in more or less mystery. Which may be explained in a measure by the unobtrusiveness of the device—it weighs approximately four pounds and is small for its weight—and the fact that to all intents and purposes it is infallable. Outside these facts, however, its principal distinction is that it is the only four-cylinder air compressor that is designed to be used as a stock equipment on a car.

In construction, the Kellog pump is about as simple as it is possible to make it. The cylinders and crankcase are made of aluminum which conduces to light weight and the pistons are machined from cast steel and fitted with oil-tanned cupped leathers. Connecting rods are very short and the reciprocating movement is given the pistons by means of eccentrics, thus reducing to the minimum the number of small parts, nuts and bolts that are necessary. One of the noteworthy features of the pump is that there is but one valve to each cylinder as against the two which ordinarily are used. The functions of the second valve are performed by the pistons themselves in conjunction with a row of tiny holes at the base of the cylinders. When one of the pistons starts its downward travel on the inspiration stroke, the check-valve at the top automatically closes and consequently a partial vacuum is formed above the piston. When the piston reaches its lowest point it uncovers the cylinder wall ports and air rushes in to fill the partial vacuum. Of course, when the piston starts its upward travel the check-valve opens and the air is forced into the tire. As lubrication is effected with semi-fluid oil, which does not require replenishing for months at a time and as there are the minimum number of moving parts it follows that inspection is necessary only at long intervals.

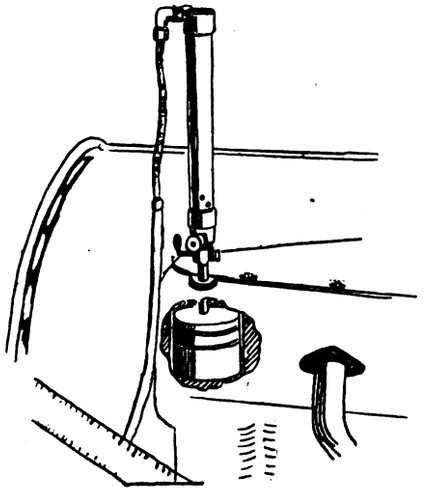
By reason of the construction of the Kellog pump, its location on a car may be largely a matter of choice the only requirement being a bracket and a rotating shaft. Several manufacturers locate the pump on the engine and among the cars so equipped is the Stevens-Duryea, the installation being shown in the accompanying illustration. The pump is mounted on a special bracket which is cast integral with



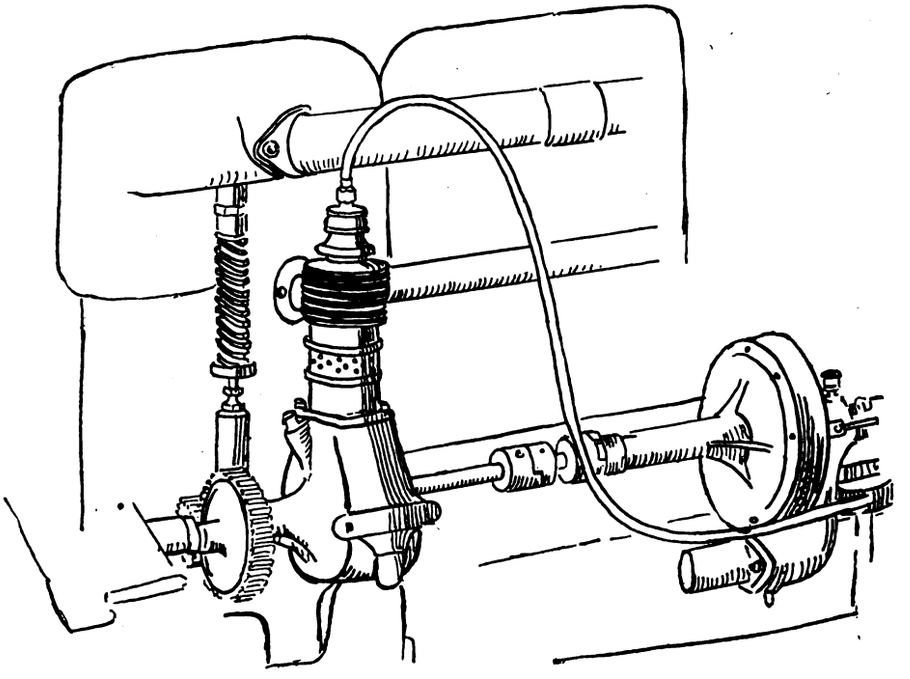
LOCATION OF GARFORD PUMP BELOW PROPELLER SHAFT



NATIONAL SINGLE-CYLINDER COMPRESSOR



INTER-STATE CYLINDER PUMP

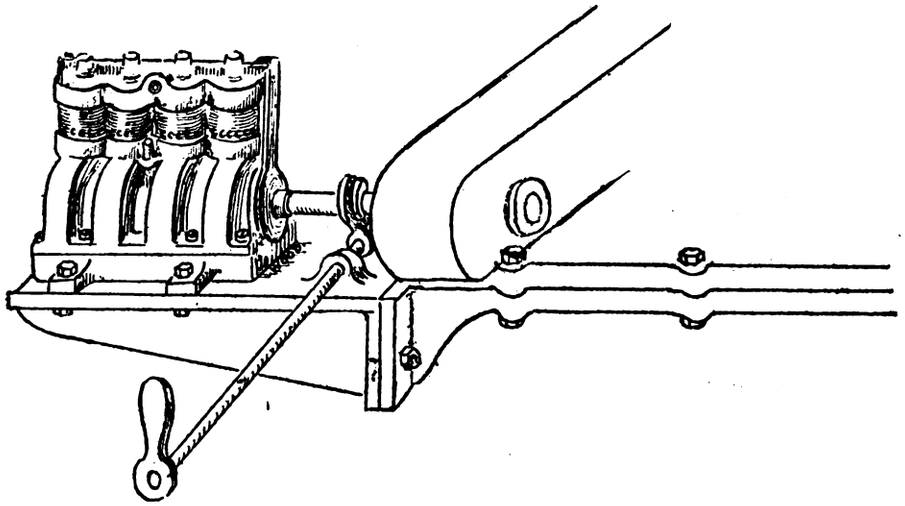


PIERCE-ARROW SINGLE-CYLINDER AIR COMPRESSOR

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the engine crankcase. The drive is by means of a train of gears from the crankshaft of the engine. The intermediate gear in the train slides on its shaft and when it is desired to operate the pump is meshed with the driving gear mounted on the crankshaft, the method of shifting the gear being shown quite clearly in the sketch. In this position the pump is in a direct draft from the fan and this is less likely to heat up, though the likelihood in any case is remote for the normal speed is but 550 revolutions a minute and the cylinders are so small that but little heat is generated.

The manufacturers of McFarlan cars have adopted a quite similar method of mounting the pump, though the method of driving is quite different as may be seen by reference to the sketch. The pump is mounted on a bracket directly over the water pump shaft from which it is driven through the intermediary of a "silent" chain and a miniature cone clutch. To operate the clutch a wire leads to the dash. The installation is unique and is worthy of comment in that it suggests a simple manner in which an amateur might install a pump, though unless proper precautions are taken trouble is very likely to result.



COLUMBIA-KNIGHT TRANSMISSION-MOUNTED AIR PUMP

It must be apparent that the amount of power absorbed by any air pump will vary according to the capacity of the pump. Inasmuch as the pump shaft of an engine is designed to transmit only a small amount of power, attaching auxiliary machinery to it should be attempted only after a careful survey of other locations with a view to leaving the pump shaft free if possible. If it becomes necessary to drive the air pump from the pump or magneto shaft the driving gears should be placed as close to the shaft bearings as possible so as to minimize the bending strain and reduce the wear in the bearings. Obviously, if the pump shaft is of very light construction such an installation is out of the question.

In both the Columbia-Knight and Peerless cars the pump is located on the change gear case and is arranged to be operated directly from the lay shaft in the change speed mechanism. The location has much to commend it inasmuch as the pump is thoroughly protected from accidental injury while at the same time accumulations of dust and dirt are less likely to cause trouble. In both cases, the pump is thrown into or out of engagement by means of a lever that extends through the chassis frame in a convenient position. The lever operates a positive dog clutch in each case.

Single-cylinder pumps, though slightly less in vogue at present than the four-cylinder pumps, are simpler and steadily are growing in popularity. The National pump, which is illustrated herewith, is unique in that it is made integral with the crankcase of the engine which houses the "works" of the pumps. The pump is bolted to the front end of the engine crankcase and is operated by means of a cone clutch which is mounted on the end of the camshaft. A threaded rod with a large milled nut and a small lever permit the clutch to be engaged or withdrawn at the will of the operator. In Pierce-Arrow cars, a single-cylinder air pump is mounted on the engine crank case in such a way that the crankshaft of the pump is virtually a continuation of the water pump shaft. The pump is operated by means of gears, one of which is slidably mounted so that the pump may be made operative or inoperative at will.

The Garford pump, which also is of the single-cylinder variety, is located on the change speed mechanism and receives its power from the lay shaft in the same manner as the Kellog pumps which are mounted on Columbia-Knight and Peerless cars. The lever by means of which the operation of the pump is controlled is extended through the chassis frame as is the air outlet. Consequently it is but a moment's work to attach a hose to the air outlet and to the tire valve and turn the lever thus putting the pump in operation.

As standard equipment on Inter-State cars, the manufacturers have adopted the F & O pump which is marketed by Daniel G. Trench & Co., Chicago. The pump is unusual in that it is of spark plug variety but is so constructed that its operation does not hinder the firing of the cylinder to which it is attached. The pump as attached to an engine is shown in the accompanying sketch from which it may be seen that it is not intended to occupy a permanent place on an engine. Instead, it is intended to be attached only when required, a spark plug being removed for the purpose. Briefly, it consists of a cylinder which encloses a piston to which is attached a long rod which projects down through the spark plug hole and rests on the top of the engine piston. The pump piston is spring returned and is claimed to be equally quiet and efficient at any speed. One of the attractive features of the device is that it has but two moving parts, the piston and a check-valve, and is devoid of gears. Needless to add, only pure air is compressed and forced into the tires.

Canadian "Agrimotor" Tests in July.

Just how long it will be before the field of usefulness of the horse as a material aid in tilling the soil is reduced to no small measure scarcely can be as much of a conjecture as it was but a short time ago. Already gasolene tractors and plows and steam traction engines have demonstrated their genuine worth for such work and it is doubtful if any one thing has served to bring home the value of the modern gasolene engine on the farm more forcibly than the annual farm motor competitions which are held in connection with the Canadian National Industrial Exhibitions in Winnipeg, which this year will be spread over the period July 3d to 20th.

In the internal combustion engine section, there are five divisions according to the piston displacement in cubic feet a minute, a method of rating that is peculiar to the committee having the tests in hand. In order to arrive at a comparative figure, it is assumed that the piston speed is constant at 700 feet a minute in which case the rating is obtained by multiplying the total piston area by the constant 700. The five classes that are provided for are as follows: (a) gasolene engines of 300 cubic feet and under; (b) gasolene engines of over 300 and under 500 cubic feet; (c) gasolene engines of over 500 cubic feet; (d) kerosene engines of less than 500 cubic feet; (e) kerosene engines of 500 cubic feet and over.

For the divisions in the steam section the following formulæ are given, A equaling the piston area in square feet, P, the boiler pressure and 450 a constant which is equivalent to average piston speed:

(f.) A × 450 × P, divided by 500=60 or under.

(g.) A × 450 × P, divided by 500=over 60 and under 100.

(h.) A × 450 × P, divided by 500=100 or over.

Not more than one engine in each class may be entered unless the engines be radically different in construction as to power equipment.

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WHAT MAKES THE ENGINE BREATHE

How Connecting Rod Angularity Affects Piston Speed—Varying Air Pressure That Necessitates Vent Pipes.

Breathers or vents in the crankcase of a four-cylinder motor are by no means unnecessary appendages, though at first blush they may seem illogical. If there is any leakage past the pistons they prevent the accumulation of gases in the crankcase. In the case of a very leaky piston or pistons this pressure may amount to a good deal, and would force oil out at every little opening, to say nothing of the danger of filling the crankcase with a combustible mixture and igniting it by a streak of hot gas. Besides, the constant "breathing" action, the alternate in-taking and puffing out of air, must help, to some extent at least, in keeping the crankcase, the oil and the bearings cool.

But the question arises: Why should there be any "breathing?" At any point in the stroke of a four-cylinder motor there are two pistons moving up and two moving down; when there are two at the top, there are two at the bottom. Obviously, as all pistons have exactly the same displacement per stroke, the air displaced by a pair of descending pistons should be exactly balanced by the space left by the ascending pair, causing a certain amount of internal perturbation of the air, but no increase or decrease in pressure. Nevertheless, the breathers breathe, and sometimes they go so far as to spit out a fine spray of oil that gets all over the engine What is the reason?

The breathing action is explained by the phenomenon known as the angularity of the connecting rods. It is of course a familiar fact that as a rod moves away from the dead center, when it is straight up and down, it forms an angle with the axis of the cylinder, the angle increasing as the crank end of the rod swings out. After passing the midstroke position the big end swings in as it travels down until it again is on dead center and in a vertical position. The piston actually moves faster on the first half of the down stroke than it does on the last half; similarly, it travels faster on the last half of the up stroke than on the first half. The reason is found in the fact that the movement of the connecting rod big end is a compound motion—a combination of vertical and horizontal movements. Put the big end, disconnected from the crank, on the center line of the cylinder and move it in a perfectly straight horizontal line and as it moves away from the center it will cause the piston to move downward slightly, the movement increasing with the angularity of the rod. Moving the big end back to the center will push the piston up again.

This is exactly what happens in the regular stroke ;the effect of the horizontal motion of the big end is added to that of the vertical motion. Therefore, as the piston starts the downward stroke the connecting rod big end starts to swing out and this swinging out adds to the speed of the piston. On the last half of the down stroke the big end swings in, and the tendency to push up the piston slows down its speed. Thus in a four-cylinder motor the two pistons that are making the first half of their down stroke will move faster than the two that are making the first half of the up-stroke and there will be a slight increase in pressure. The conditions are reversed when the middle of the stroke is passed, the up-going pistons increasing their speed because they are being accelerated by the inward swing of the cranks, and the opposite effect taking place with regard to the downgoing pistons. Thus there will be an increase and a decrease of pressure, or alternate pressure and partial vacuum, every half stroke of the motor and the effect will be seen in the rapid air pulsations at the outlet of the breather pipes. The breathing action is much more marked when the motor is running slowly, and the shorter the connecting rods in proportion to the stroke length and the greater their maximum angularity the stronger the breathing will be.

What is Possible When Minus a Jack.

A rather strenuous method of raising one wheel of a car was adopted by a solitary traveler who found himself without a jack and without anything that could be used as a lever. The axle on the side to be raised was blocked up, the blocks being wedged as tightly as possible. Then the air was allowed to escape from the tire. The blocking prevented the wheel from sinking when the tire deflated. A flat stone was forced under the tire, which was inflated, raising the car enough to permit wedging the axle a little higher. A repetition of the process raised the axle high enough for the purpose—but there was a period of physical recuperation before the repair was made.

Oil That is Unfit for Clutches.

Mineral lubricating oil, such as automobile cylinder oil, is unsuitable for use on a "fierce" clutch leather because, though it will ease it somewhat for the time being the oil ultimately will carbonize and harden the leather, so that the last condition of that clutch will be worse than the first. Castor oil is the proper dressing for leather faced clutches.

Little Solder Makes Strong Joint.

In soldering or brazing it is not necessary to make allowance between the pieces to be joined for the uniting metal. The less of it there is, the stronger will be the joint. Spelter, as used in brazing, is particularly penetrating and it is practically impossible to fit two pieces together so closely that the melted metal will not run between.

INFLUENCE OF CARBURETTER SIZE

Old Question Revived and Answered by Able Authorities—Rate of Gas Flow That Determines Throat Area.

On more than one occasion the question has been raised as to whether it is possible to economize in fuel consumption by fitting to an engine a carburetter of larger size than is supplied as stock equipment. And though is may seem on superficial examination that the possibility of thus making an engine less voracious is within expectation, there are several immutable laws which militate against any such simple solution of the fuel consumption problem.

Those who have given the matter a little, though not quite enough, thought, may perhaps have been led to assume that less gasolene would be used with a larger carburetter because the speed of the air through it naturally is slower, and it is a well known law that the suction in a pipe bears a direct relation to the amount of flow through a jet in the pipe. That is to say, when the suction in the area surrounding the jet is known, it is a simple matter to reckon what is the rate of flow through the jet, because the suction and the rate of flow are in ratio to each other. Hence, if the suction is less, which must be the case where the same volume of air is drawn through a large pipe in the same time interval as is required for a like volume to be drawn through a smaller pipe, the flow at the jet must be proportionately decreased, assuming, of course, that the level of the fuel in the float chamber remains the same in both cases; which might lead to the supposition that less gasolene would be used and economy thereby effected.

But as the quantity of gasolene used in turn bears a direct ratio to the power developed, the burning of less fuel quite automatically reduces the power output. Consequently, there can be no economy, if the word is understood practically as a synonym for efficiency, which it is and should be, for the proportion of power developed to fuel consumed remains the same. If the level of the fuel in the float chamber is raised so as to increase the normal flow of gasolene through the jet, another difficulty arises. The speed of the air may not then be sufficient properly to atomize the fuel, with the result that "loading up" takes place and the power of the engine drops off accordingly. Similarly, it is quite probable that difficulty may be experienced in properly adjusting the auxiliary air valve, for if the spring is set to operate through a certain range of suctions and the range is altered, trouble likely will result.

The size of a carburetter for a given engine almost invariably is determined by computing the velocity of the air through the intake pipe, and experience has proven that for a throat of constant diameter a

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speed of about 100 to 125 feet a second for a vertical throat, or 120 to 130 for a horizontal throat, is productive of the best results. For instance, assuming an engine to have four inches bore and five inches stroke, and to be capable of being throttled to at least 150 revolutions a minute, a carburetter that will properly fill the cylinders will require to have a throat area of approximately 2½ square inches if it is of the horizontal type, and 3 inches if it is of the vertical type. The reason for the difference in throat areas is that the resistance to the air is greater in the case of a horizontal throat, the air entering and then impinging against the back wall of the intake pipe.

It scarcely is necessary to point out that the piston displacement of an engine and the speed at which the pistons reciprocate determine the amount of suction in the intake pipe and consequently the velocity of air in it. A small intake pipe on a large engine will be productive of high air velocities, and vice versa. Therefore, in determining the size of the intake pipe, the manufacturer of the engine automatically determines the size of the carburetter that will prove most efficient. It follows that to alter the size of the carburetter is contrary to the dictates of prudence and should not be attempted without good and sufficient reasons backed up by the advice of the manufacturer.

There is one condition under which the fitting of a larger size carburetter may be productive of greater power, though there are no data to show that efficiency is increased or economy of fuel effected. Incidentally there is no way to determine whether the change will be beneficial except by the "cut and try" method. If a carburetter is not sufficiently large properly to fill the cylinders at high engine speeds, there is little doubt but that the fitting of a larger carburetter will permit the development of greater power. At any rate, such is the experience of the Stromberg Motor Devices Co., as expressed by C. W. Steger, general manager for the company.

"It is the usual practice where the maximum power is required from an engine to install a larger size carburetter," he says. "This permits the operator to increase the volume, at least, in the present design of carburetters. This idea does not work with all types of carburetters, however, but, generally speaking, it does so with the conventional types such are marketed in America at the present time. The power at maximum speeds of the motor equipped with a 1½-inch carburetter (which normally required a 1¼-inch carburetter) would no doubt be somewhat increased, but this increase of power would not show throughout the entire range of the motor speeds. It would not be any less than with the 1¼-inch carburetter, provided proper adjustments were made."

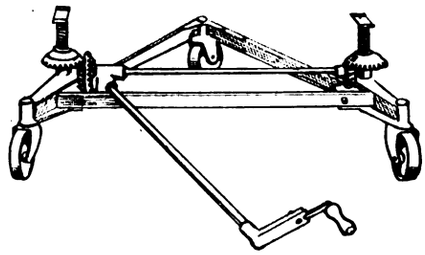
Practically the same view is held by George T. Briggs, the Wheeler & Schebler expert.

"Our experience indicates," he says, "that using a 1½-inch carburetter on a 1¼-inch manifold probably will increase the horsepower of the engine, but it is apt to hurt the operation of the engine at low throttle. We always recommend the same size carburetter in every instance as the size of the manifold opening, except that for extreme speed a larger carburetter sometimes will help matters slightly."

Quite likely the folly of attempting to increase power or efficiency by fitting a smaller carburetter than is recommended by the engine manufacturer is self evident enough, though in at least one case a motorist who apparently was possessed of the requisite amount of gray matter in other respects did just that thing. Needless to say, the effect was practically the same as if he had purposely limited his throttle opening, and the falling off in power was nothing short of alarming.

Combining Jack and Castor Truck.

A new garage appliance which combines in a single piece of apparatus two lifting jacks and a castor truck has just been



WEAVER TWIN JACK ON CASTORS

placed on the market under the designation "auto-twin jack" by the Weaver Mfg. Co., of Springfield, Ill. The new jack has two lifting heads which will raise two wheels of a car simultaneously, being operated by a single hand crank through a shaft and bevel gears; the long crank shaft makes it unnecessary for the operator to get into uncomfortable attitudes in order to do the work. The whole affair is mounted on easy-running castor wheels, so that once the car wheels are raised clear of the floor the machine can be swung around as if on a turntable, and that without danger of upsetting the jacks, owing to the wide spacing of the castors.

The jack is built on a triangular steel frame with a castor at each angle. The lifting heads are gear-operated screws, the nuts having gear teeth which mesh with bevel gears mounted on the opposite ends of the shaft which, in turn, is geared to the operating handle, so that all the gears move together when the handle is turned. The crank telescopes; for quickly lifting a light car it can be shortened, and for heavy work it can be extended in order to give the requisite leverage. Friction, which would be a serious matter in a jack of this type with plain bearings, is minimized by the use of anti-friction bearings at the more important points. The gear nuts which raise the screws run on ¼ inch steel balls; the castor sockets are fitted with ball bearings; and the castor wheels run on roller bearings. The screws are of 1 1/16 inch steel, hardened. The weight complete is 45 pounds.

Figuring Horsepower of Electric Vehicles.

It is an easy matter for the user of an electric vehicle to ascertain at any time what horsepower is being developed by his motor. By taking the amperes and the volts, as shown by the meter, and multiplying one by the other the current consumption in watts is obtained. Dividing the wattage by 746, the number of watts that constitute one horsepower, gives the electrical horsepower. The actual output of the motor will be the electrical horsepower less the loss through the motor. If the efficiency of the motor is 85 per cent., 15 per cent. deducted from the electrical horsepower will give the motor output. A quicker method, a shade less accurate, is to take the number of watts, add to it a third of itself, and point off three decimal places. The result will be the electrical horsepower within a very small fraction of absolute accuracy. Of course there still is the deduction to be made for the motor loss.

Air Locks in the Gasolene Line.

It not infrequently happens that a motor will run very irregularly, fire back through the carburetter and even come to a stop just after the gasolene tank, previously entirely empty, has been filled. Air in the gasolene is responsible, the flow of fluid being interrupted. The trouble is most likely to occur where the gasolene pipe is looped or coiled in order to avoid danger of breakage through vibration. If the loop is made to lie in a horizontal position, so that every part of the pipe will slope in the direction of the feed, air-locks cannot occur.

Vanadium for Babbitting Purposes

While the use of vanadium as an alloy of steel for the purpose of producing a metal of extreme strength is a familiar one, it is less well known that vanadium is used in at least one make of babbitt metal and improves the quality of the bearings very greatly. The Enterprise Metal Co., of Syracuse Co., N. Y., which makes the vanadium babbitt, expresses the opinion that the alloy results in a much smoother metal, as well as one that is stronger in every way than ordinary babbitt, and will outwear the best babbitt two to one.

Where Scraping is Better Than Acid.

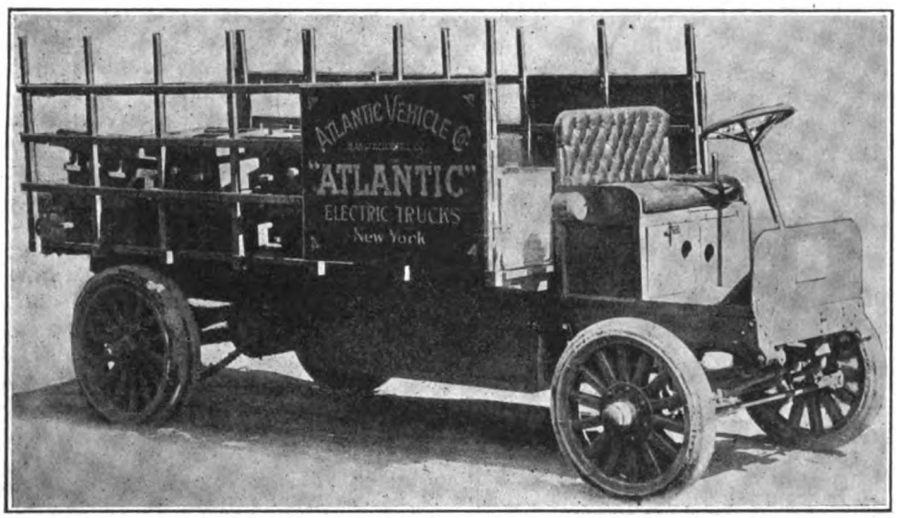
Mechanical means, such as filing or scraping, are far better for cleaning surfaces to be soldered or brazed than treatment by means of acid. Acid may not remove all traces of grease, and the acid itself may remain in traces sufficient to weaken the joint and allow it to part under strain, which obviously is undesirable.

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FIRST ATLANTIC ELECTRIC APPEARS

It is a Commercial Devoid of Radical Ideas —Standardized Construction Throughout Its Most Striking Characteristic.

After a fruitful period of exhaustive experimental work, the Atlantic Vehicle Co., which as was stated some two months ago in the Motor World has acquired a well-equipped plant in Newark, N. J., whilst maintaining headquarters at 1600 Broadway, New York, finally has placed on the market its first product—an electric commercial vehicle which in design and construction reflects the previously expressed intentions of its designer to produce a modern vehicle in every sense of the word. So that there may be a vehicle suitable for every class of work, the line includes four models ranging in capacity from one ton which is the smallest, to five tons, which is the largest. Except for the capacity differences and a proportionate difference in the strength of materials and the size of component parts, the four vehicles are built along identical lines and exhibit absolutely no radically new features. Instead, the manufacturers have followed standard practice which has proved in years of development to be productive of the greatest efficiency. Improvements have been made here and there as a matter of course though in the main there is little deviation from that which has become orthodox.



FIRST OF NEW COMPANY'S OUTPUT—THE ATLANTIC ELECTRIC

The lightest vehicle in the line is rated at one ton capacity and the chassis is so arranged that a maximum loading space of 8 x 5 feet is available despite the fact that the wheelbase is moderate and measures only 8 feet 6 inches. The wheel tread is 60 inches, the front wheels being constructed to carry 34 x 3½ single solid rubber tires and the rear wheels to carry 36 x 4 inch single tires. The next larger sized vehicle, rated as 2 tons capacity, has an available loading platform of 10 feet 6 inches x 5 feet on a wheelbase and tread of 9 feet 6 inches and 62 inches, respectively. The front tires are 34 x 4 inch single and the rear are 36 x 3 dual. Both the 3½ and 5-ton models have loading spaces of 12 x 6 feet, the wheelbase and tread in the case of the former being 11 feet 6 inches and 71 inches, respectively, and in the case of the latter 12 feet and 75 inches, respectively. The wheels of the 3½-ton model are shod with 36 x 5 front and 40 x 4 dual rear tires and those of the 5-ton model with 36 x 6 front and 40 x 5 dual rear tires.

Not the least important of the many excellent features of the line as a whole is that insofar as is possible the construction has been made to conform to the Society of Automobile Engineers' standards, a work which reflects the active part which Arthur J. Slade who is the designer, has taken in the affairs of the society. In view of the fact that the facility with which commercial vehicle tires can be changed often has a definite bearing on the efficiency of the vehicle as a means of transportation, particular attention has been paid, first, to the necessity for providing tires of adequate size, and second, to making their fitting as simple as possible. Consequently, the tires in each case are of sufficient size safely to carry the loads and maintain a high factor of safety and the wheels are constructed to the recently adopted S. A. E. standards. By reason of the large size tires used and the proper proportioning of the load weights, it is stated that tire manufacturers are enabled to allow the purchasers of Atlantic trucks a greater tire mileage guarantee than can be allowed with any other make of commercial vehicle.

The same liberality as is evidenced in the size of the tires is apparent throughout the vehicles, parts in each case being constructed to permit of the greatest possible factor of safety without unduly increasing the chassis weight. Timken roller bearings are used throughout and other materials have been selected with a view to obtaining the maximum strength consistent with comparatively light weight. That the batteries may be subjected to as little of the inevitable road vibration as possible great care has been taken to insure perfection of spring suspension and to this end the springs are manufactured of imported silico-manganese steel and are so proportioned that the minimum shock is transmitted to the running gear. As a single instance of the thoughtfulness which is evident in the design, the spring eyes are bronze bushed and the bolts are self-lubricating and are hardened and carefully ground. Frames are rolled channel sections and the axles are drop-forged, the front member being I-beam section and the rear rectangular in section.

With a view to increasing the efficiency of the operator by lightening his labor as much as possible an irreversible type of worm steering gear has been adopted and the column and wheel are inclined at an angle calculated to permit quick action with the minimum of effort and the maximum of bodily comfort. Similarly, the controller, which is of the constant torque drum type and provides four speeds forward and two reverse, is so located that the operating handle comes within convenient reach of the driver. One of the excellent features of the controller is that the contact fingers are liberal in cross section and the arrangement of all the parts is such that repair or renewal of the fingers or drum contacts is a simple matter and requires but a few minutes.

Motors is each case are suspended from the side members of the frame by crucible steel cross members provided with lugs and the leads are exceptionally large in order to reduce to the minimum the drop in voltage between the battery and the motor. The motors themselves are of the well-known General Electric Co. manufacture and have the large commutator surface that is distinctive of the brand. Armature shafts are mounted in annular ball bearings and the motors are designed for exceptionally low internal resistance and have high temporary overload capacity. They are wound for 85 volts, the current consumption in the case of the four sizes being 22, 28, 40 and 60 amperes, respectively. Other voltages can be supplied at the option of the purchaser. Any make of battery will be supplied, though standard equipment is 44 cells of Hycap-Exide, the number of plates being 13, 17, 21 and 25 for the four size trucks, respectively.

The first reduction from the motor to the road wheels is by means of Morse silent chain, the chain and the sprockets being enclosed in a tight housing which retains the lubricant and prevents excessive wear due to road dirt. Both of the sprockets are made of mild steel in order to reduce the wear on the chains and insure maximum life to the sprockets. The jackshaft unit is so constructed and mounted that it may be removed as a unit. The differential is of the bevel gear type and the jackshafts are mounted on annualr ball bearings which

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in turn are supported in Shelby seamless steel tubing. The outer ends of the tubes are brazed into crucible cast steel members which carry the outer ball races and are supported from the jackshaft hangers. Final drive is by side chains, the jackshaft sprockets being cast steel and those on the rear wheels being crusible steel. Two sets of brakes are provided, the service set being of the internal expanding type operating on drums bolted to the rear wheels and the reserve brake being by a contracting band on a drum on the jackshaft; both are operated by pedals.

The standard equipment as supplied with all the four models includes dashboard mounting a Sangamore ampere meter, footboards, driver's seat upholstered and accommodating two persons, main circuit switch, charging receptacle, one tail lamp, two side lamps, electric bell and kit of tools. Though the manufacturers are prepared to supply any type of body to suit the requirement of the purchaser, the list prices are for chassis alone and are as follows: 1-ton, $2,400; 2-ton, $3,000; 3½-ton, $3,500; 5-ton, $4,000. The approximate weights of the vehicles, equipped with lead battery are 4,400 pounds, 5,700 pounds, 7,700 pounds and 9,200 pounds. The normal speeds with full load are respectively 10, 10, 8 and 7 miles an hour.

Despite the comparative youth of the Atlantic Vehicle Co., which was incorporated only last March and of which McKinley Boyle is president and Ralph Sanger vice-president and general manager, production has been pushed and vehicles now are ready for the market. Arthur J. Slade who is well known by reason of his designing work, is chief engineer of the new company. Of the seven millionares who are said to be backing the company, the name of but one, Harold S. Vanderbilt, has been permitted to escape. He is one of the directors.

Grounding Wire of Ignition Systems.

When attaching the ground wire of an ignition system, it is well to make sure that it is fast to something that is in metallic circuit with the rest of the system. For instance, if the ground wire should be attached to a metal fitting on the engine side of the dashboard the current would be interrupted by the wood of the dash, unless there should happen to be metallic connection with the frame of the car. Coppel plating the head of a cap screw to which the ground wire is attached, will not only insure a better contact, but a more lasting one.

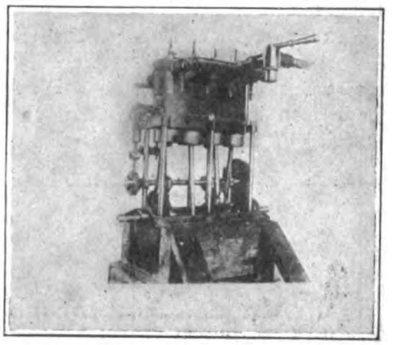
Common Cause of Porcelain Breakage.

A common cause of breakage of spark plug porcelains is a too vigorous use of the wrench in tightening the bushing, so that the brittle insulation is subjected to a strain that is just about all it can stand; the additional pressure caused by expansion under the influence of heat adds the "last straw."

KING DISPOSES OF SMITH'S CLAIM

Brings Evidence That First "Four" Was Built in 1894—Also Sold Motor Drawings to Buffalo Engine Makers.

Who built the first American four-cylinder car? The question has been raised as a result of the publication of a description and an illustration in Motor World of May 16th last, of a home-made four-cylinder car, built in 1901 by Fred F. Smith, of Bridgeton, N. J., and which Smith stated he believed to be the first four-cylinder car built



KING'S FOUR-CYLINDER ENGINE

in the United States. Smith's claim, however, is quite effectually upset by the King Motor Car Co., of Detroit, which brings to bear evidence that in 1894, seven years before the Smith car took the road, Charles B. King installed in a motor car a four-



KING AND HIS ORIGINAL CAR

cylinder long stroke motor of his own design, of the now popular block-cast type, with a bore of 2¾ inches and a stroke of 5¼ inches, and operated the machine on the streets of Detroit. The ancient vehicle and engine are shown by the accompanying illustrations. The statement made by Smith that he used a Buffalo engine also arouses the interest of the King company, which writes:

"We note that Mr. Smith states that the motor is a ten horsepower Buffalo motor, which still further interests us, as Mr. King sold the patterns and drawings for his 1894 motor to a party named Annersley, who organized the Buffalo Gas Engine Co., and it would not be surprising if the motor which appears in this Smith car was built according to the drawings mentioned; it gets right back to the starting point, namely, that Mr. King not only designed the first four-cylinder motor ever built in this country, which was used in the first automobile run on the streets of Detroit in 1894, but also is the designer of the Buffalo motor which Mr. Smith used in his car in 1901."

Why Motors Are Often Dirty.

There are some gasolene motors—a good many of them, in fact—that invariably look dirty and sloppy and no amount of cleaning will keep them looking presentable. They are covered with oil and with the dust and dirt that oil so efficiently collects, and there usually is a pool of black much in the bottom of the pan. There are other motors that never seem to get very dirty. A little dust collects, but is easily cleaned off, and it is not much of a job to keep such a motor looking very respectable indeed.

Investigation usually will indicate that there is a very intimate relation between the condition of the motor and that of the joints in the lubricating system. With joints that leak, even a little, or with breathers that constantly sputter out oil, or with crankcase or other gaskets in bad shape, it is an absolute impossibility to keep an engine clean, and there is little use trying to do it. The remedy of course is to tighten up the leaky joints, renew the defective gaskets and enlarge the breather pipes, make them higher or else put a couple of wire gauze screens in them, if such screens are not already fitted.

In two-cylinder opposed motors the crankcases usually are carefully fitted in order to avoid leakage, for as the pistons move upward simultaneously considerable air pressure results and oil is forced out through any crevices that may exist. This is one reason why some motors of this type are so extremely dirty. A cure for such trouble may be effected in many cases by inserting a very small ball check valve in the top of the crankcase, opening outward. This will cause a slight vacuum in the crankcase, and the tendency will be to draw the oil inward rather than force it out.

Of course there will be pressure during part of the stroke, but the vacuum will be effective for a sufficient proportion of the time to keep the engine much cleaner than before. It goes without saying that such an arrangement cannot be used where the crankcase pressure is utilized to force the oil to the bearings. In such a case the only thing to do is to overhaul the leaky joints and make them tight, which proceeding, incidentally, ought to result in a slight increase in crankcase pressure and consequently in a slightly more rapid oil feed, though it is doubtful if the difference would be sufficient to make any great readjustment necessary in a majority of instances.

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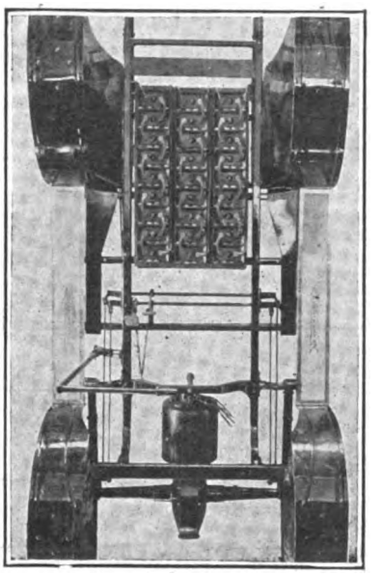
BATTERY LOCATIONS IN ELECTRIC VEHICLES

How Accessibility of Source of Current and Correct Distribution of Weights on Axles Are Obtained —Storage Cells Stand Equally Well Whether United or Divided—Waste Spaces in Car Bodies Made Useful by Skillful Designing.

In the designing of a motor car, whatever may be the type of motor employed for its propulsion, the problem of proper distribution of weight is one that necessarily is handled with extreme care because of the direct influence of weight distribution upon the comfort of the passengers, the tendency of the car to skid on slippery surfaces when the brakes are applied, the amount of wear on the tires, the ease and steadiness of steering gear operation and so on.

In the prevalent type of gasolene car, experience and the survival of that which is fittest, have resulted in a weight distribution that is practically fixed, because the locations of the major weights have become standardized, with the motor at the front and the passengers and the heaviest part of the body toward the rear. The designer can vary the distribution slightly by comparatively small variations in wheel positions and in the seating of passengers; but the latitude for shifting weights is not considerable.

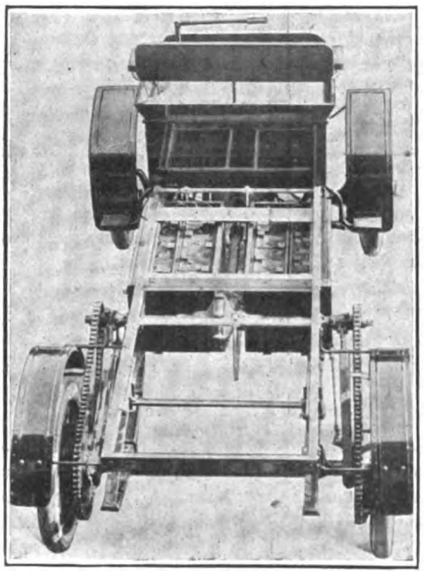
In the case of the electric car, however, practically no restrictions are placed upon the engineer in regard to the placing of weights, for the simple reason that the battery, which forms a sufficiently large proportion of the total weight of the car to control the proportionate loads on the axles, can be placed almost anywhere. Not only is its position with relation to the motor a matter of no consequence so far as propulsive efficiency is concerned, but it is not even necessary to put it all in one place. It can be divided and subdivided, or it can be massed in a unit; gaps can be spanned by wiring which in no wise militates against the operation or the efficiency of the power plant. Moreover, though the weight of the battery is considerable, it is a quiescent weight; there is no internal vibration to be considered in the working out of the design. Even the position of the motor does not necessarily interfere with the placing of the battery, for it is no more confined to any one place in the general assembly than is the battery, thanks largely to the rapid development that has taken place in shaft drive for battery cars. It is evident that the builders of electric cars are by no means blind to the freedom that is allowed them in the location of batteries, for in the vehicles that are now on the market there are examples of many arrangements and divisions of batteries—in fact, it is difficult to conceive of any plan for the disposition of the source of current that has not been put to use. This latitude in the placing of the power plant is in no small measure responsible for the wide variation



FRONT LOCATION—HUPP-YEATS

that exists in the forms of electric pleasure vehicles.

But though the designer is but little troubled by restrictions as to where he will put his battery and his motor, there are contributory factors that call for the exercise of no little skill and judgment in working out any given location for the battery. Once the question of relative axle weights has been settled, the proper distribution of the heavy weights must be attacked with the question of accessibility clearly in mind. It is not sufficient that it should be possible to reach the battery; it must be easily reached, for though modern improvements have brought it to a state where constant attention is not required, it is like everything else that is human-built in that it sometimes will go wrong. Neglect is one of the worst enemies of the battery, and a battery that is very easy to reach is far less likely to suffer from lack of attention than one which can be examined only with considerable preliminary difficulty. In the typical commercial electric vehicle the battery is slung in a cradle under the body, which leaves the entire floor space clear for loading purposes. In order to examine the cells, which are grouped in trays, each containing as many cells as can be handled conveniently, it is necessary to remove or lift up the side covers and draw out the trays one by one. This arrangement answers very well for burden-bearing cars, for it is the routine duty of some one to examine the batteries at certain times, and time is allowed for the purpose; but in a pleasure car there is far more danger of neglect if the cells are not placed within easy reach by the mere lifting of a lid or the opening of a door Other considerations aside, it is quite foreign to the general character of a vehicle, modern and luxurious in every other way, to have an inaccessible battery. Even the smaller business cars are in some cases being brought more nearly to the pleasure car standard in the matter of battery accessibility, though in their case the matter is one of less importance, perhaps, and of considerable more difficulty on account of the limitations imposed by the demand for loading space.



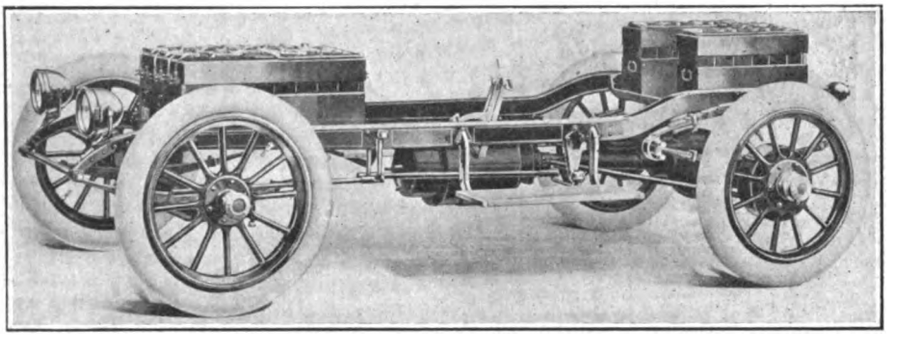
SPLIT BATTERY—M. & P.

While in some instances the adoption of shaft drive has permitted improvement in the matter of battery placing, for the reason that the motor is readily placed as far forward or back as may be necessitated by the general layout, on the other hand, it has not interfered with the typical commercial underslung arrangement, as is clearly shown by the accompanying illustration of one of the light vehicles made by the M. & P. Electric Vehicle Co., of Detroit. In this machine, the motor is located forward of the battery, driving through a long propeller shaft to a countershaft and thence by

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side chains to the rear wheels. To make room for the propeller shaft the battery merely is separated longitudinally and a few inches space left through which the shaft passes. This division of the cells is quite common in battery cars, especially of the larger sizes, in which the batteries are underslung; the only variation consists in the separation of the two sections.

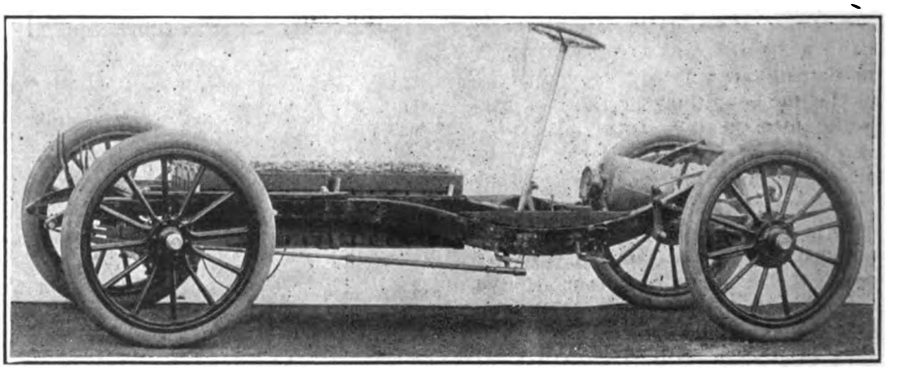
Thanks to the facility with which battery position can be adapted to vehicle form, the attractive lines of the gasolene runabout have been incorporated in electric vehicles with no small measure of success. While this type of body would be practically impossible with a conventional underslung battery, its evolution is made quite a simple matter by the expedient of putting the battery where it occupies space that otherwise would be vacant, as is done in the case of the gasolene type two-passenger runabout of the Argo Electric Vehicle Co., of Saginaw, Mich. , This machine, which not only has the appearance of a gasolene runabout, but has a speed of 30 miles an hour and is rated as being capable of covering a distance of 100 miles on a single charge of the lead battery, has its battery, undivided, placed partly under the Renault type hood and partly under the footboard. By lifting the hood and part of the floor-board the entire battery is laid bare for inspection or testing. In this type of vehicle the greatest body weight, as well as the weight of the passengers, is quite far back. Consequently the battery is placed well forward, and its weight balances the rear weights to a nicety, the axle loads being alike within 100 pounds. As the car is low hung, economy in vertical space is a prime necessity, and this is accomplished in the case of the battery by hanging the cells between the main frames, so that there is a saving in height equal to the depth of the frame, as compared with a position above or below the frame. The Hupp-Yeats, built by the R-C-H Corporation, of Detroit, is another fine example of the forward battery position. In this car the weight is almost equally distributed between the two axles, the rear axle carrying four-sevenths and the front axle of course bearing three-sevenths. Though the removal of an entire battery is not a thing that requires to be done often, in the case of this car it can be done in a few minutes, such is the accessibility of the arrangement.



DIVIDED BATTERY, AS EXEMPLIFIED BY DETROIT ELECTRIC

The fact that a storage battery consists of a number of units, each complete in itself, and so can be divided into as many parts as may be desired, so long as proper connections are made, is taken advantage of by a large number of manufacturers of electric cars, who divide the battery into two sections, usually of unequal weights, and place one section at the front and the other at the rear; usually the heaviest load of battery is placed in front to balance the combined weights of body, motor and passengers which necessarily are more or less concentrated on the rear axle. There are very good reasons for this way of disposing of the battery—so good, in fact, that there probably are more electric vehicles employing this arrangement than any other. The facility with which the weight can be proportioned to exactly suit the conditions is obvious. By reducing the number of cells in one group and adding correspondingly to the number of cells in the other the weight can be changed with the utmost ease and the proportionate axle loads made whatever may be required. As motor car bodies usually are built, it is common to provide projections at front and rear beyond the passenger space; in front the projection may take the form of a hood, of the gasolene car type, or it may be of more or less modified box form, while the rear may be an elevated platform on which is mounted a rumble seat, or a plain box-like affair. In either case they form convenient battery boxes, not only providing protection for the cells, but also permitting instant access through hinged covers. A chassis with the battery disposed in this way can be fitted with a body of almost any type in which the passengers are not seated close to the rear axle. The illustration shows the chassis of the Detroit electric, built by the Anderson Electric Car Co., of Detroit; various bodies are mounted on this chassis, both open and closed types, including a runabout of the gasolene type. Similar arrangements are employed in the Babcock, Baker, Broc, Ohio, Standard, Studebaker, Woods, Waverley and other electric pleasure vehicles. In at least one case, that of one of the Waverley cars, the rear sections are so close together that the division does not affect the balance of weights, but is carried out for convenience in arrangement in the body.

In commercial vehicles there is very little variation from the standard underhung cradle. The absolute necessity for keeping the loading space entirely unencumbered practically eliminates all positions other than the one commonly used. But while the underhung cradle is a necessity, it has much to recommend it. The fact that it requires a certain amount of space under the body makes no particular difference, for there is nothing much to be gained by hanging a delivery wagon very low. By properly calculating the position of the battery its weight can be made to proportion the axle loads as may be desired. The low battery position means a low center of gravity and a stability that belies the high-perched appearance of some of the light cars. There is one feature of the underhung battery cradle that is a positive advantage, and one that increases as the size of the vehicle and the weight of the battery increase. That is, the short distance the trays of cells must be lifted in taking them out of the cradle or putting them in place. While this does not have to be done very frequently, as already has been said, it sometimes is necessary, and every additional inch between the ground and the cradle means extra time, trouble and risk of battery damage from dropping or slipping from the hands of the men handling it. A big battery is an extremely heavy thing to handle, and if placed higher than the usual low-hung box it would be a matter of the greatest difficulty to handle the trays



ARGO RUNABOUT CONSTRUCTION—BATTERY ALL IN FRONT

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without some manner of mechanical aid. Occasionally there are special vehicles built in which there is very little space to spare in horizontal directions, but plenty of room vertically. In such cases batteries may be installed in two tiers, one above the other. While this arrangement hardly would work out well in ordinary vehicles because of the height of the upper tier, in the special cases where such an arrangenemt is used special arrangements naturally are made to take care of the high cells—differential chain hoists, for instance. Such a special vehicle is the front-driven battery fire engine recently installed in Brooklyn, which has a two-tier battery.

For pleasure car work the underslung battery has practically disappeared along with noisy gearing, slow speed and extremely limited radius of travel. Together with silent running, reasonably high speed and battery capacity, ample for all ordinary use, has come the concealed, yet instantly accessible battery, placed in space otherwise unused and detracting not at all from the appearance of the car.

"Insurance Policy" Covering Spark Plugs.

That growing tendency on the part of manufacturers of automobile accessories to express their faith in their product and at the same time give the purchaser confidence and protection by issuing guarantees that are considerably more emphatic than those of conventional form, is aptly reflected by the "insurance policy" issued by the Sturdy Mfg. Co., of Chicago, manufacturers of the Sturdy spark plug. It is a legal looking document, in which the manufacturers guarantee their plug "unconditionally, for life, against everything but misuse (by misuse we mean concussion). We agree to keep you in good plugs as long as you use your car." With every set of four or more plugs an extra "insurance" plug is furnished, to be used in case it becomes necessary to return one of the regular plugs to the makers for replacement under the guarantee. Incidentally, the construction of the plug in question involves the employment of double porcelain insulation, there being an inner and an outer porcelain held against copper-gasketed seats by nuts under which are double spring washers which permit expansion under heat without danger of breakage. The porcelains are seated in a bushing that is removable without taking the shell from the motor cylinder. The makers state that throwing cold water on a plug heated to the highest temperature attainable in a motor will not damage the insulation.

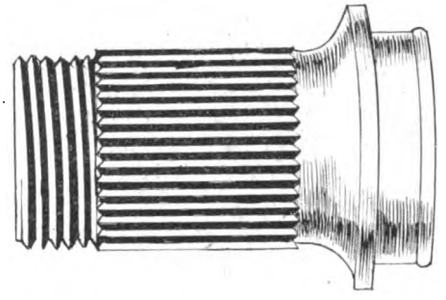
Fire That Will Melt Hardest Brass.

A temperature that readily will melt the hardest brass and will almost melt iron may be attained by placing a few pieces of charcoal in an angle formed by a backing of fire-bricks and directing on the charcoal the flames from two gasolene blowtorches, the flames converging at the point where they impinge on the charcoal.

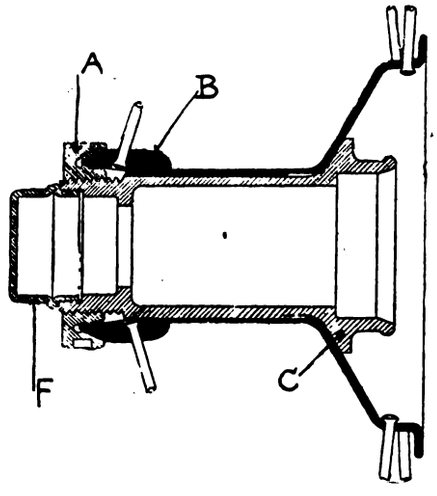
WIRE WHEEL DEVELOPMENT ABROAD

Rudge-Whitworth Radically Improves Its Former Design—New Wheel Has a Novel Self-Locking Mechanism.

Having evolved a type of wire automobile wheel and a method of construction, both of which have been prolific of results that have served to compel attention, the British manufacturers of Rudge-Whitworth wheels have, as the result of several years experiment and study, brought out a brand new hub and locking mechanism that is a radical departure from all other devices of the sort. Despite this fact, however, the new mechanism is more than ordinarily simple and is claimed positively to remove the last chance of danger due to a wheel loosening and coming off on the road.



RUDGE-WHITWORTH SERRATED HUB



SECTIONED VIEW OF HUB

Though the methods by which Rudge-Whitworth wheels in the past were prevented from coming off spontaneously, so to speak, they appeared to be all that could be desired and recorded instances of such occurrences have been conspicuous for their infrequency, the mere fact that there was a slight hazard in that a wheel might possibly drop off is claimed to be one of the principal deterrents to the popularity of wire wheels.

The new wheel consists of but three parts, the wheel proper which with the distinctive method of attaching the spokes to the hub remains unchanged, the hub, which is new, and a locking ring, which also is new. The hub, which is illustrated herewith, is serrated for the whole of its central portion. When the wheel is in position the serrations engage with others inside the hub shell to which the spokes are attached and consequently sustain all the driving and braking strain which thus is removed from any part of the locking mechanism. The locking ring (A) is shown in the accompanying sectional drawing from which its form and relationship to the rest of the wheel may be judged. B is the wheel hub to which the spokes are attached, C is the axle hub, which remains fixed in place unless it is necessary to remove it for inspection or to insert lubricant in which case an outer or dust cap (F) first is unscrewed.

The operation of the whole mechanism depends primarily upon the form of the locking ring and the manner in which the V-slot in it engages the outer edge of the wheel hub. When a wheel is to be locked in place it is merely necessary to slide it on the axle and give the locking ring one or two turns with the fingers. The outer edge of the wheel hub then fits into the V-slot in the locking ring and as the wheel is not perfectly tight there is a certain amount of movement caused by the weight of the car. The clearance between the parts is such that the axle hub and the wheel hub become slightly eccentric which causes the wheel hub to press against the upper and inner side of the locking ring slot. Locking then becomes automatic for the friction between the wheel hub and the locking ring causes the latter literally to screw itself up. Probably the most unusual feature of the arrangement is that immediately the wheel is securely locked in place the turning action on the locking ring ceases for the reason that the wheel hub and the axle hub then become concentric. Consequently, it is impossible to "over-lock" or to jam the mechanism. For the same reason, driving the car backward does not cause the locking ring to loosen. It is stated that even should a car be driven backward with the locking ring loose the distance which must be traversed in order to cause a wheel to drop off would be upward of a mile and as a car seldom if ever is driven for such a distance except in a forward direction there is little to fear on this score. It is needless to add that the threads on the right side wheels are of the right-hand variety and those on the left side are of the left-hand variety, which introduces the necessity for carrying two spare wheels in place of one provided the self-locking feature, which presumably is the raison d'etre for the new construction is to be enjoyed by motorists.

However, the wire wheel is a little lighter than the corresponding sized wood wheel, yet the carrying of two wire wheels would mean a considerable increase in extra weight; yet the two would probably not be as heavy as some extra equipment which is carried at present.

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ELECTRICAL TESTING MADE EASY

Cheap Method of Regulating and Gauging Currents—Putting a Battery "On the Tub"—Engine and Generator Tests.

It not infrequently happens that a great deal of time, and perhaps considerable expense and trouble, can be saved, or perhaps some much-desired information obtained by being able to measure electric currents of considerable strength. For instance, a storage battery that is not used often enough to give it the "exercise" that it should have to keep it in the best condition may be completely discharged and then re-charged in order to bring it up to normal condition. It may be desirable to discharge a battery in order to ascertain its capacity; or it may be desired to measure the capacity of a generator, or to measure the horsepower of the motor that drives it—all of which may be accomplished by means of an arrangement that is almost ridiculously simple, costs little or nothing and is sufficiently accurate for all practical purposes, though not up to laboratory standards, and which is not used as generally as might be the case.

Take the case of a battery which is to be discharged: It is possible, of course, to make the discharge by jacking up the rear wheels of the car and running the motors. This method is objectionable, however, for several reasons. It subjects the machine to considerable unnecessary wear and tear, and it is not possible to obtain much regulation of the current unless the brakes are used constantly in order to slow down the motors and make them work hard and absorb considerable energy. Obviously this is altogether too hard on the brakes to be at all desirable. Running light, the motors will take so little current that the battery will not be exhausted for an interminable time. The method to be described, however, allows the battery to be discharged at its normal rate, or, for that matter, at any rate that may be desired, leaving the motors and driving mechanism of the car wholly out of the question.

In order to obtain really accurate information as to battery capacity it must be discharged at the ampere-hour rate given by the manufacturers as normal. For instance, a battery having 11 plates in each cell is given a rating of, say, 140 ampere-hours at a four-hour discharge rate. This means that if a battery, fully charged, is discharged at the normal rate it will deliver a total of 140 amperes, or 35 amperes per hour. It is much like drawing water from a barrel. If the barrel contains 140 gallons and the water is allowed to flow at the rate of 35 gallons per hour, it all will be gone in 4 hours. There is this difference, however, between the battery and the barrel: it does not matter how fast or how slowly the water is run off, the total quantity will be the same, while in the case of a battery, a discharge rate in excess of the normal results in internal heating which absorbs a portion of the current and so cuts down the total output, while on the other hand, a slower discharge rate results in a slightly higher total output. This is why a time limit is set in rating batteries.

To return to the main question: The apparatus required to absorb electrical energy and regulate the discharge rate consists of a wooden tub or barrel filled with water, a little salt and two plates of sheet iron, or even bars, and the necessary wiring, which should be heavy enough to carry the current without the slightest sign of heating. The cables from the battery are disconnected from the motor of the car and each is connected to one of the iron plates, being twisted on so as to give a good contact. The current should be turned off at the controller and the plates carefully kept apart to avoid the possibility of a direct contact, which would result in a pyrotechnical display of extreme suddenness and would very likely damage the battery considerably, if not ruin it entirely. The plates, with wires attached, are placed in the tub of water in which a handful of salt has been dissolved. The water without salt would not act as a conductor; the more salt is used, the greater the conductivity of the water. With a little salt and the plates as far apart as the width of the tub will permit, turn on the current.

It will be understood, of course, that the volt-ammeter of the car is to be left in circuit, or, if there is no meter on the car, that one is to be wired in, for without a meter there would be no check on the discharge rates, and not only would the result be unknown, but there would be grave danger of discharging too rapidly. When the current is turned on it is altogether probable that the flow will be very light, as indicated by the ammeter, and the voltage high. That is, the amount or volume of current that can get across the water resistance is small and the pressure—or voltage—required to force even that small volume across is high. So the plates must be brought together a little to decrease the resistance, or a little more salt added, or, if there is an extremely low current flowing, both. By cautious manipulation of the salt and the plates, the proper amperage and voltage for the discharge may be secured, taking the manufacturer's figures. The brine will bubble and boil, and turn brown and "soupy," but this will do no harm. If the test is to cover the full period of four hours—the usual time—it is best to use a good sized tub or other vessel in order to prevent excessive boiling and evaporation. Adding water during the discharge is apt to upset the adjustment somewhat, though it can be done.

An ordinary iron pail can be used with small batteries, the pail itself forming one of the electrodes and one of the wires attached to it in any convenient way that will give a good contact; the other wire is connected to a plate or bar that is suspended in the water from a wooden crosspiece. Adjustment is made by dropping the movable electrode, or by shifting the cross-piece to bring the plate nearer to one side of the pail. Still another method where a barrel is used is to place one electrode on the bottom of the barrel, with the connecting wire, well insulated, running down the side of the barrel to it, and hang the second plate in the barrel from a cross-bar, and raise and lower it for adjustment. Other variations of the scheme will suggest themselves if different arrangements are made necessary by different conditions from time to time encountered.

Testing a generator is carried out in the same way as testing the battery discharge, so far as the resistance is concerned, except that the voltage must be carefully watched, for if the resistance is allowed to get too high the voltage is liable to rise excessively and puncture the insulation of the generator windings. If the load imposed upon the generator is beyond its capacity, either it will be slowed down, or, if the engine or other driving power is sufficient, it will be forced to the work and the winding will be burned out. By imposing too heavy a load is meant the opening of an easy path for the passage of current, either by the use of a considerable quantity of salt or by bringing the electrodes close together.

In order to test the horsepower of an engine—or, for that matter, of whatever may be driving the generator—it is necessary that the efficiency of the generator be known—that is, the proportion of the energy put into it by the engine that comes out in the form of electricity. Suppose, for instance, that it is desired to ascertain the horsepower of an engine at 1,000 r. p. m., and it is known that the generator has an efficiency of 85 per cent. at that speed. Current readings are taken while the engine runs at that speed, and the readings, taken in volts and amperes, converted into watts and the watts into horsepower, and to this is added the 15 per cent. loss occurring through the generator. Assume that the meter shows 60 amperes at 85 volts while the engine is driving the generator at 1,000 r. p. m. To arrive at the number of watts, the volts and amperes are multiplied together and the watts divided by 746, the number of watts in 1 horsepower. This gives 6.8 horsepower, to which must be added the 15 per cent. wasted in the generator, making the total 7.2 horsepower. The efficiency of the generator will vary more or less with its speed, and must be taken into consideration in making power calculations. This is a wonderfully good method of making carburetter adjustments, however. Even if the efficiency of the generator is not known and the exact horsepower output cannot be ascertained, changes due to carburetter adjustment can be noted instantly on the meter, which shows every instant just what work the engine is doing.

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1,007,710. Heating System for Explosion Engines. Stanislaw J. Lukaszewski, Detroit, Mich., assignor of one-half to Joseph Folta, Sylvester I. Kolkiewicz, and John Rzodkowolski, Detroit, Mich. Filed Dec. 8, 1910. Serial No. 596,209.

1. The combination with the cylinders and radiator of an explosion engine, of pipes between the same to convey the circulating liquid, and a heater comprising a coil and burner, one end of said coil connected into one of the pipes, the other end connecting to the radiator, said heater adapted to prevent the circulating liquid from chilling.

1,007,729. Carburetter for Internal Combustion Engines. Peter A. Poppe, Coventry, England. Filed Feb. 6, 1909. Serial No. 476,402.

In a carburetter, the combination with a casing having an air inlet and a carbureted air outlet, of a cylindrical throttle valve rotatably mounted within the casing and having ports adapted to simultaneously control the said air inlet and carbureted air outlet, said throttle valve also having an inwardly-extending flange, a cap projecting upwardly above said flange and arranged concentrically within the throttle valve and having an outwardly-extending flange and also an eccentric outlet opening, a jet nozzle arranged within the cap and having an opening with which the opening in the cap is adapted to be brought into and out of register when the cap is turned, means for turning the cap, and a pin and slot connection between the flanges on the cap and throttle valve whereby to permit the cap to at first turn slightly in relation to the throttle to cause the jet outlet to be operated



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and to thereafter cause the cap and throttle valve to move together.

1,007,774. Windshield. Frederick A. Dillingham, Troy, Ohio, assignor to the Troy Carriage Sun Shade Company, Troy, Ohio, a Corporation of Ohio. Filed Apr. 26, 1909. Serial No. 492,341.

1. In a windshield for vehicles, a lower section and an upper foldable section, projections extending from said sections at right angles to the frames of said sections and parallel with each other, said projections being located in proximity to but removed from the meeting edges of said sections, a rigid latch member extending from one of said projections and a spring latch member extending from the other of said projections, said latch members being projected in planes which lie parallel to the frames of said sections, an enlarged head on said rigid latch member, and said spring latch member having a reduced mouth to receive said head, substantially as specified.

1,007,842. Explosive Engine. Ellsworth H. Belknap and John W. Swartz, Detroit, Mich., assignors to Golden, Belknap and Swartz Company, Detroit, Mich., a Corporation of Michigan. Filed Sept. 15, 1910. Serial No. 582,137.

1. A multi-cylinder explosive engine comprising a base, a plurality of cylinders on the base arranged in pairs and the cylinders of each pair disposed in angular relation to each other, a crank shaft journaled in the base having a single crank for each pair of cylinders, a cam shaft journaled on the base parallel to the crank shaft between the cylinders of each pair, a cam on the shaft for each pair of cylinders, a cover detachably secured on the base over the crank shaft and provided with radially disposed guide apertures parallel to the respective axes of the cylinders of each pair of cylinders, a tappet rod for one cylinder of each pair adapted to be reciprocated in one of said guide apertures by direct contact with the cam, a plunger for the companion cylinder of each pair adapted to be reciprocated in the companion guide aperture of the cover, and a finger for each pair of cylinders journaled at its inner end between the casing and cover and bearing at its outer end on the cam shaft in the plane of rotation of the cam and arranged to lift the plunger.

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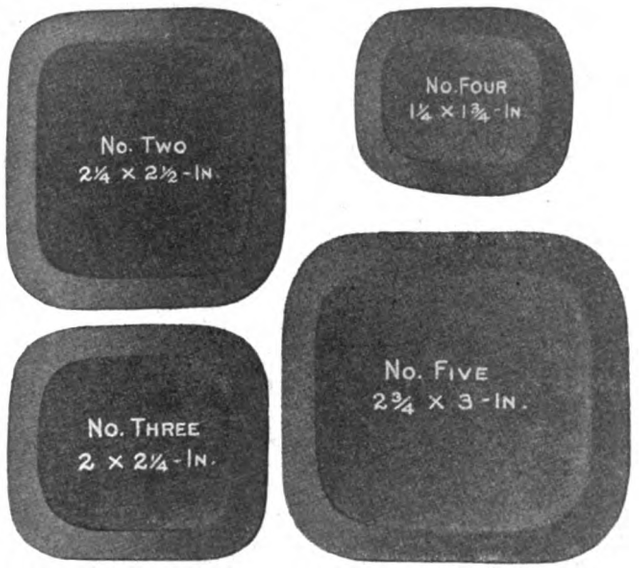
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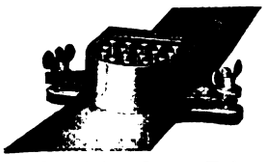
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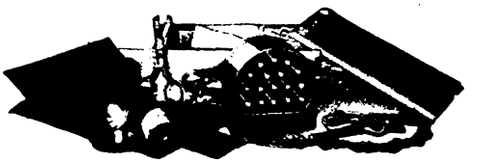
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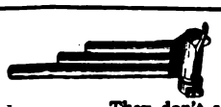
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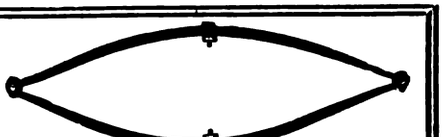
NOTHING COUNTS LIKE SERVICE Thomas TECHNICAL SERVICE for THOMAS OWNERS E. R. THOMAS MOTOR CAR CO. BUFFALO



Push Over Valve Press the Lever and It's Tight Simple, Isn't It? Grab Pump Connection 25c. at All Dealers or MOTOR CAR EQUIPMENT Co. 55 Warren Street Dept. W New York City



Perfection Spring Company SPECIALISTS IN Spring Suspension High Grade Only Cleveland, Ohio



Guaranteed Automobile Springs

Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.

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The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you cannot prevent skidding or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with Weed Chains.

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them on the front wheels too.

For your own safety—for the safety of the public, fully equip your car with Weed Chains. Make it your business to get a set today.

Recommended and sold by all reputable dealers

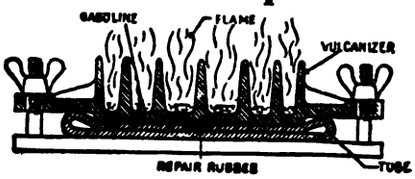
Weed Chain Tire Grip Co.
28 Moore St. New York

The Name "Weed" on Every Hook

The Inner Tube—Repair It Yourself

On the road, or at home—anywhere with

The Imperial Vulcanizer Repair Kit



Patent Pending Nickel Plated

One ounce of gasoline and a little rubber gives you practically a new inner tube in 15 minutes.

Price $3.50 Complete

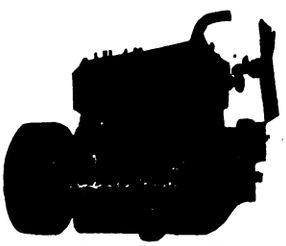
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Guaranteed to Satisfy

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"CONTINENTAL"



Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders 20 to 60 H. P.

Write for Booklets

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Complete information furnished on request.

The Locomobile Company
BRIDGEPORT, CONN.

Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.

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All Standard Bearings

are fully described in our

New Catalog 24 A

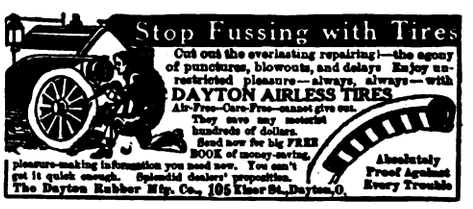
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Standard Roller Bearing Company
PHILADELPHIA

Woodworth Treads

will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.

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LBA STORAGE BATTERIES

Class A for Electric Lighting
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Manufactured by
Willard Storage Battery Company
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75% Increase in Tire Efficiency

That's what the INNERSHU accomplishes. It's a tough, durable, rubberized fabric formed permanently to tire shape. Ask for circular.

INNER SHOE TIRE COMPANY
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For Pleasure Cars and Light Delivery Cars

Send for Booklet 58

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Executive Office: Akron, Ohio

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Standard Tire & Rubber Co., 104-106 Portland St., Boston
Distributors for New England States

A—Shows *double*, notched treads.
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D—Shows absorbing means when passing over an obstruction.

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LOOK FOR THE LABEL

It's always on a good "MAZDA" Lamp

Federal Miniature Lamp Works
of the General Electric Co.
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"National" Steam Vulcanizers

GARAGE MODEL repairs three tubes and two casings at a time. Cheapest and best on the market. Get our special selling plan. Portable model for individual owners which will please your customers. List price, $12. Manufactured by

THE NATIONAL MOTOR SUPPLY CO.
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Aluminum Bodies

THE SPRINGFIELD TOP
(Pat. 1895)

SPRINGFIELD METAL BODY CO.
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"Extra Service"

The *extra* mileage that is possible with Federal Tires has won the favor of experienced automobilists. In actual service Federal Tires demonstrate they are capable of rendering maximum mileage.

Federal Tires cost no more than other high grade tires, but are cheaper in the end because of the "Extra Service" they render. Give Federal Tires a trial—they never disappoint.

Made in all types for all standard rims

Federal Tires are supplied through leading dealers everywhere. An interesting tire book mailed to all who write.

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DEPENDABILITY and Reliability are inseparable from Quality. In steering gears, Reliability is of vital importance. It is not a matter of money—it's a matter of safety.

Warner Steering Gears, Mr. Manufacturer, are your best pledge of Safety, which means a Big Asset in your business. You are justified in using them by our eight year old reputation for building the highest grade steering gears produced.

Besides, we give you prompt and dependable deliveries, service and satisfaction. Write.

We modify our designs to meet your detail requirements, or build to approved designs on seasons quantity specifications.

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Self Starter HANNA

Watch the Prices Drop!

Just as the Hanna self starter—the only 100% efficient self starter that does not foul or soot your plugs—was imitated by those who followed our lead so now is the price of the Valentine manifold starter being met.

Remember We Were the Originators

Not only were we the first to produce an acetylene self starter but we were first to introduce a manifold self starter at the right price, $10.

Our Price Does Not Cut the Dealer's Profit

Still some fine territory open. The profit is big. Our goods are right and fully guaranteed. Write today.

J. H. VALENTINE COMPANY

Syracuse, New York

The Valentine STARTER MANIFOLD and Gas Lighter

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A TWITCHELL AIR GAUGE at $1.00



Statistics show that 26 per cent. of all tire trouble is caused by improper inflation.

Statistics show that you can take one thousand miles of service out of a set of tires by driving them partially inflated over ten miles of road. This means you can only get Big Mileage out of tires inflated to the right pressure.

The Twitchell Air Gauge

tells you in a minute if your tires are properly inflated. That is why the TWITCHELL AIR GAUGE is tire insurance; that is why it is a guarantee of maximum tire efficiency.

You simply apply the gauge to your valve and the indicator shows your tire pressure. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.

Price $1.00 Each

Now Ready for Shipment
Can Be Obtained From Your Dealer

Twitchell Gauge Mfg. Co.

1256 South Michigan Avenue
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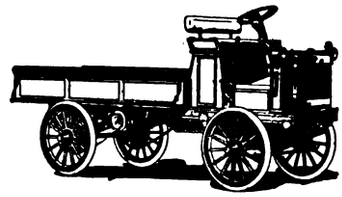
or A NEW SET of TIRES at



Sanford

Our claims are neither extravagant nor unwarranted

Chassis $1600



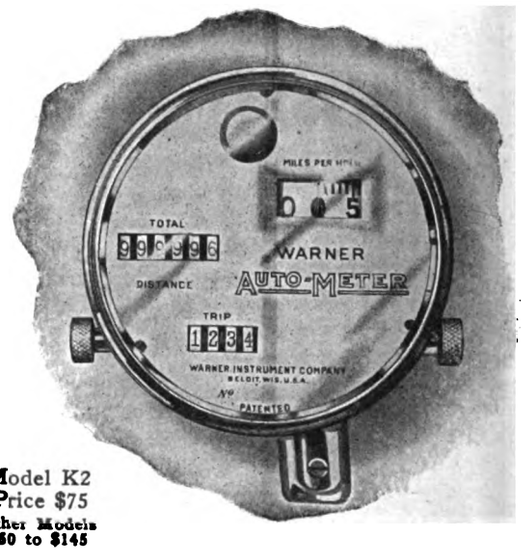
Stake or Express Body $1750

Briefly, we claim that Sanford one-ton trucks at our price both to the dealer as well as to the consumer offer as fine a money making proposition to both dealer and consumer as there is on the market.

Sanford trucks are honestly built by a corps of men who have been specialists in one-ton truck building for nine years—which, of course, means lots of advantages in Sanford trucks not found in others.

The Sanford Motor Truck Co.

SYRACUSE, NEW YORK



Model K2
Price $75
Other Models $50 to $145

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"The Aristocrat of Speed Indicators"

THE man who **takes pride in his car** is the one who appreciates the Warner most. He would never disgrace it with anything cheap, inferior and unreliable.

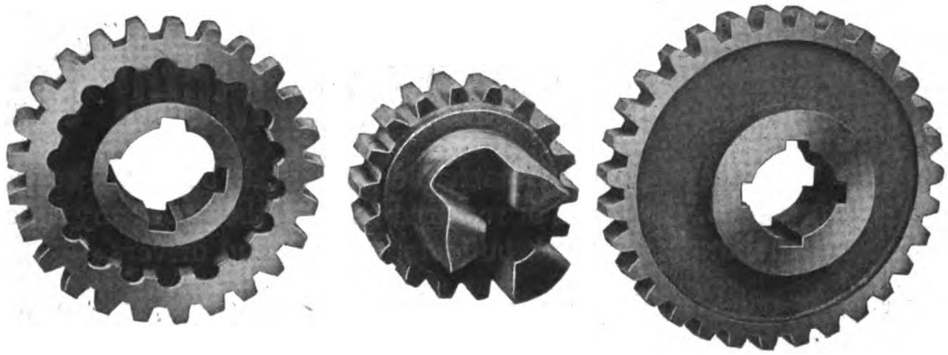
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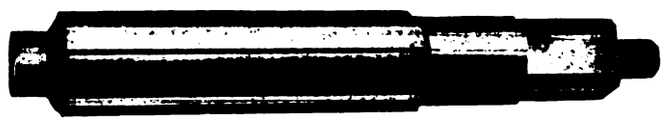
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Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
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GRANT-LEES GEARS



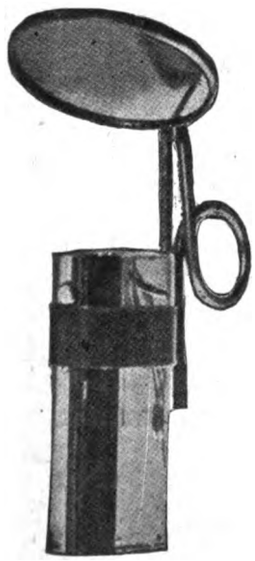


MR. CONSUMER—Do you realize

1st. Every shipment of steel is analyzed.
2nd. Every shipment of steel is sample heat-treated before being machined.
3rd. Every gear blank is inspected for bore and concentricity before cut.
4th. Every gear is inspected after cutting teeth.
5th. Every gear is finally tested for bore, concentricity and hardness.

THE GRANT-LEES MACHINE COMPANY, Cleveland, Ohio
Pioneer Helical Gear Makers in America

The Reflex



The Eye Can Pierce the Darkest Recesses

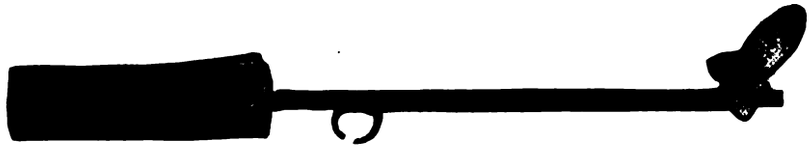
of the automobile through the use of the Reflex—a powerful hand electric light with an adjustable mirror.

This unique and most useful little device is meeting with a ready sale not only among car owners, but in garages and repair shops where, during many times in the day it becomes necessary to inspect some hidden part of the automobile—does away with the danger incident to the use of matches or candles in proximity to the gasoline.

The current for the light is furnished by a small but powerful battery, located in the handle, and one charge is sufficient for hundreds of inspections.

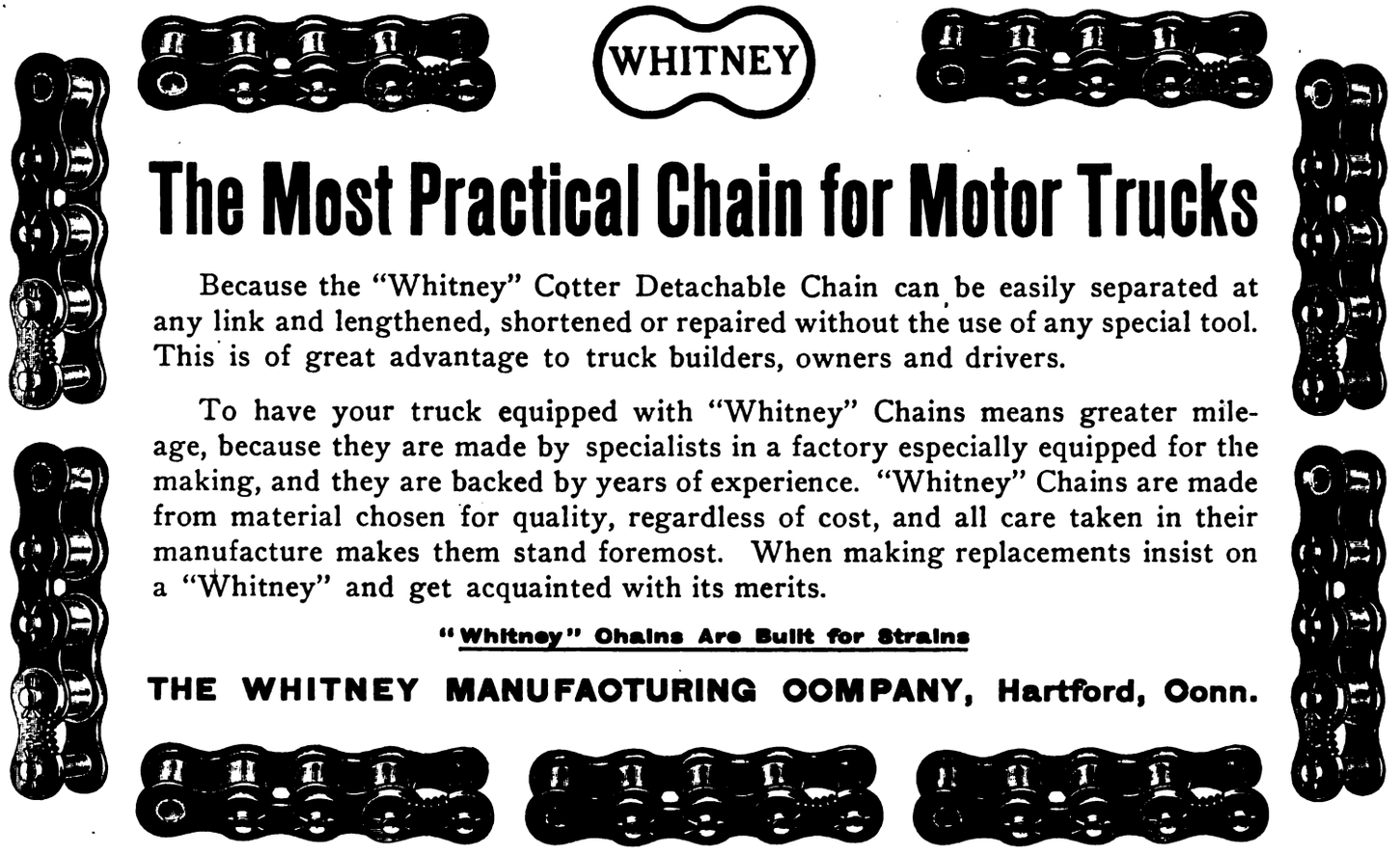
Write today and get a full description of the Reflex together with our prices to dealers.

If you sell motor car appliances, you will find this lighting device to be one of your steadiest and best sellers, after it has once been introduced.



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SOLE SALE RIGHTS FOR UNITED STATES
35-37 S. Third Avenue **Mount Vernon, N. Y.**

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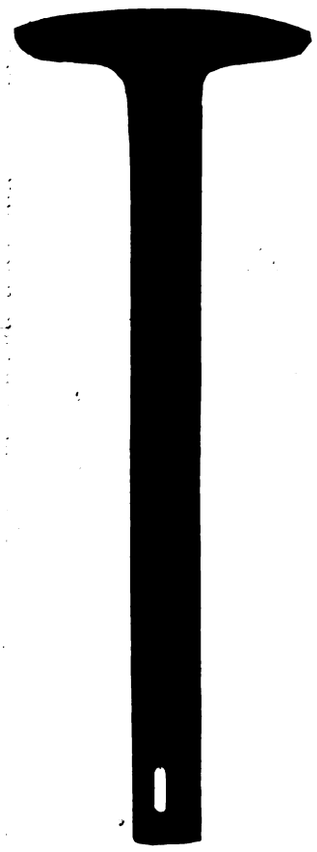
The Most Practical Chain for Motor Trucks

Because the "Whitney" Cotter Detachable Chain can be easily separated at any link and lengthened, shortened or repaired without the use of any special tool. This is of great advantage to truck builders, owners and drivers.

To have your truck equipped with "Whitney" Chains means greater mileage, because they are made by specialists in a factory especially equipped for the making, and they are backed by years of experience. "Whitney" Chains are made from material chosen for quality, regardless of cost, and all care taken in their manufacture makes them stand foremost. When making replacements insist on a "Whitney" and get acquainted with its merits.

"Whitney" Chains Are Built for Strains

THE WHITNEY MANUFACTURING COMPANY, Hartford, Conn.



THINK THIS OVER

very carefully and read it twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly - tuned up to its highest power. Perhaps the valves pit—warp - go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

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Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

THE ELECTRIC WELDING PRODUCTS COMPANY
CLEVELAND, OHIO

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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
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AJAX
TIRES

(Guaranteed 5000 Miles)

Consider What This Means

The economic value of Ajax Tires is revealed in lower tire bills, and users are assured the utmost for their purchase money.

In our policy, quality is the paramount consideration. We have spared neither time nor expense to perfect our tires. They are built for the long, strenuous grind of hard service.

Our famous 5000 Mile Guarantee means a saving of 30% to tire users.

DEALERS: Ajax Tires are the fastest selling tires on the market. As a business booster they are a wonder. Get the profits that go with many sales.

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¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

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250 West 54th Street, New York
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Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY **DURABILITY**

One, Two and Three Ton Capacity

LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

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DETROIT, MICH.—Bierl Auto Truck Sales Agency, 453 Dix Ave.
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J.I. CASE THRESHING MACHINE CO.

HOME OFFICE and FACTORY Racine Wis

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Gentlemen:-

It affords us pleasure to testify to the efficiency of your service department, your evidentelly increased desire to see that the Remy magneto gives satisfaction to customers, backed by your ready support in overcoming complaints and making adjustments cannot fail to rapidly establish the Remy magneto in the confidence of most manufacturers and owners of automobiles.

Yours truly,

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Branch House Manager.

A postal will bring scores of letters like these
Remy Electric Co
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"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.



The NEWTONE

The Mile-Away Electric
Motor Horn

MADE IN THREE STYLES
Price $20 Complete including Button and Cable

Once Hear This Horn and You Will Use No Other

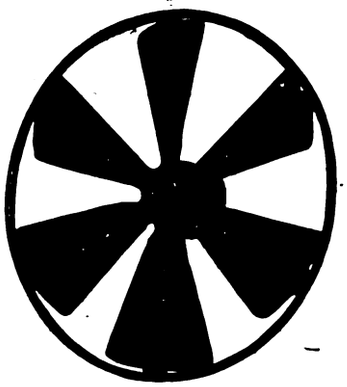
The Newtone is Unqualifiedly Endorsed by Every User.

Let Us Send One on Approval



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(Patented)

By Actual Test

The Sparks-Withington One-Piece-Blade RADIATOR FAN will deliver a greater volume of air with less horse-power consumption than any other fan on the market. Bonafide tests furnished to those interested.

With this assurance, and considering that we are specialists in fan construction where you are not, we desire the opportunity only to prove our claims, and, therefore, request your blue prints or a sample fan for estimate. Out of ten standards no doubt we can give you something without making special tools. That would mean a saving to you.

We will gladly test free of charge and submit report on fans you now employ.

Don't fail to write us when you are ready to consider 1912 contract.

THE SPARKS-WITHINGTON CO., Jackson, Mich.

Battery Boxes **Hubs Complete**
Ball Bearings **Flanges**
Brake Drums **Heavy Stampings**

BOSCH

Of Course

THE fastest Grand Prize Race, the fastest Vanderbilt Cup Race, the fastest Santa Monica Race, was made with a car using Bosch

Magneto and Plugs

What is good for a million and a record breaker is good for you.

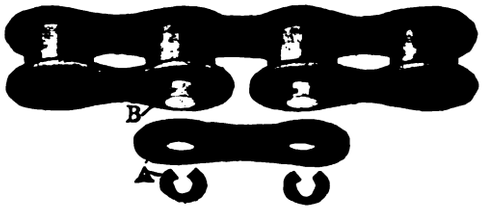
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Chicago **Detroit** **San Francisco** **Toronto**

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are used by the largest, most exacting users of chains for automobiles in the world. They need no further recommendation.



SPROCKETS We are equipped to make sprockets in large quantities at interesting prices.

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are free from troublesome details, contain more up-to-date features and give more perfect results than others because of our years of experience. We have learned the lessons other makers have yet to learn and our product is proportionately better. Send for catalog.

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INVINCIBLE STARTER

will start any four-cycle engine of four or six cylinders. Turn on the switch—that's all.

Price, NOW, Only $10

Fully guaranteed. Money back if not satisfied. Send your order today, stating make and model of your car. Illustrated Catalog Free.

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Raybestos REG. U.S. PAT. OFF.

LOOK FOR THE TRADE-MARK

Every foot of RAYBESTOS is stamped with our trade-mark. This protects you and your car. Be sure your brakes are lined with

TRADE MARK Raybestos REG. U.S. PAT. OFF.

It has the highest coefficient of friction. Made of asbestos, woven with copper wire. Heat-proof, oil-proof, gasolene-proof, and as for water—it has absolutely no effect on this lining.

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Manufacturers of Duplex and Raymond Brakes and Gyrex—The Mixer.

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ALL SIZES **ANY PITCH**

HYDRAULIC PRESSED STEEL CO.
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ALWAYS READY AND POSITIVE

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ARE GOOD TIRES

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Special Designs for Every Type of Motor Made

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"The Crankless STARTER"

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Guaranteed by our 40 years standing and reputation.

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The World's First Maker of Sixes Exclusively

Hupmobile

Long-Stroke "32"
Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

20 H. P. Models

Runabout—$750

F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

Roadster—$850

F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

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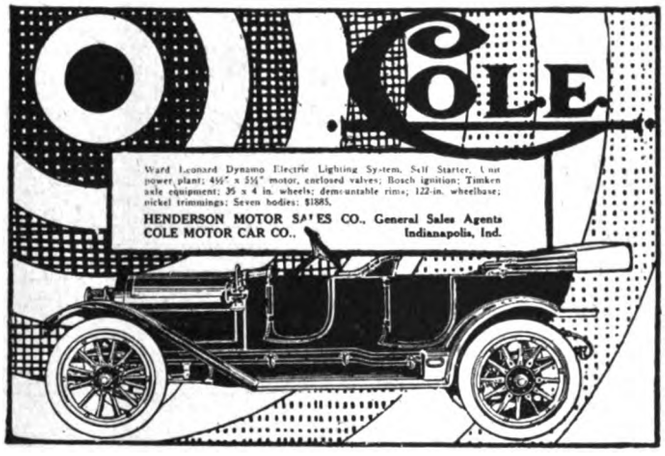
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Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

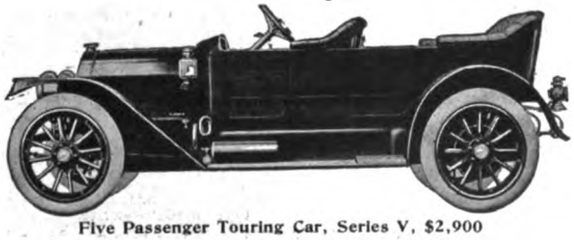
Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
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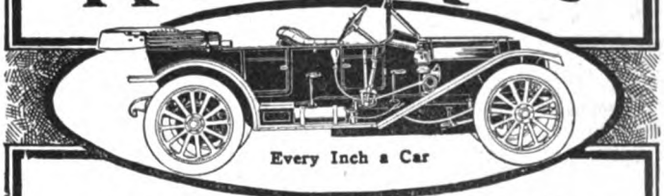


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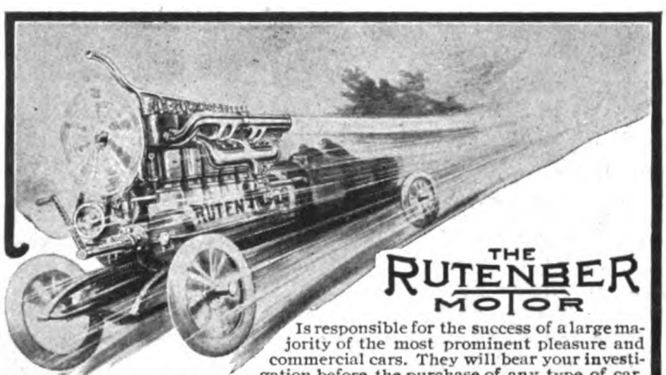
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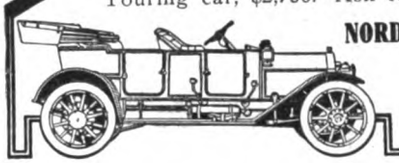
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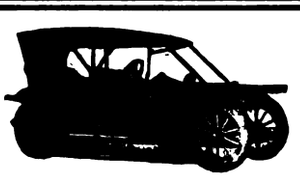
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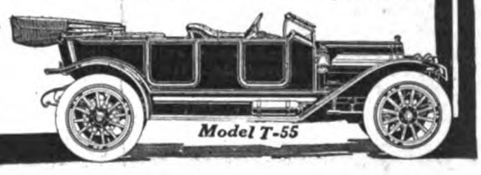
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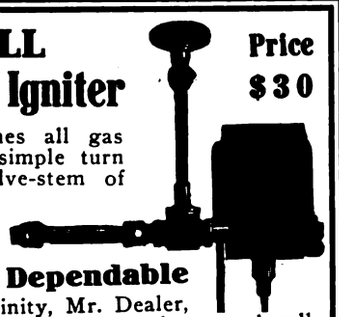
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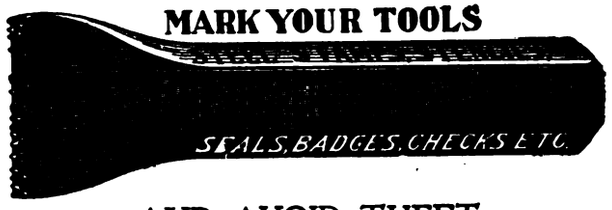
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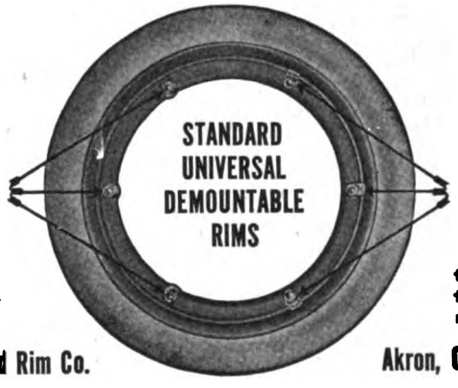
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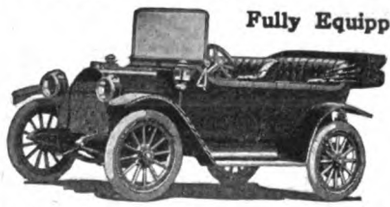
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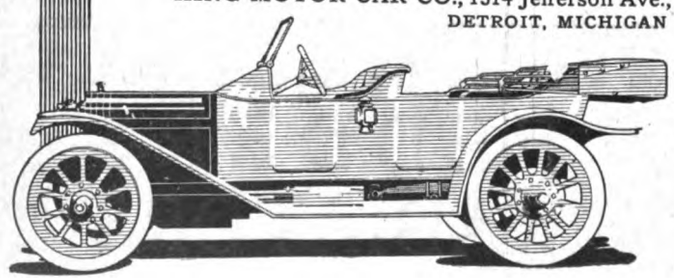
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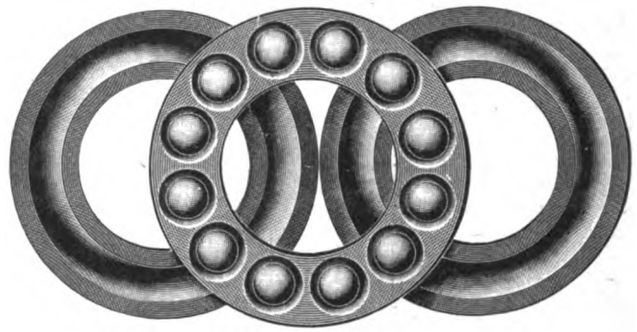
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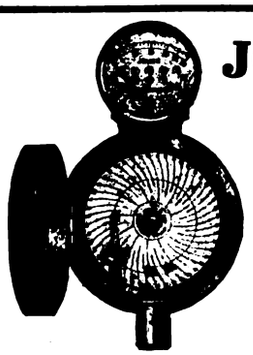
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COMMERCIAL CARS
PLEASURE CARS
KANT-BEAT

Made from Drop Forgings and Case Hardened Throughout.

ACCURACY, RELIABILITY AND SATISFACTION GUARANTEED

Prompt Deliveries

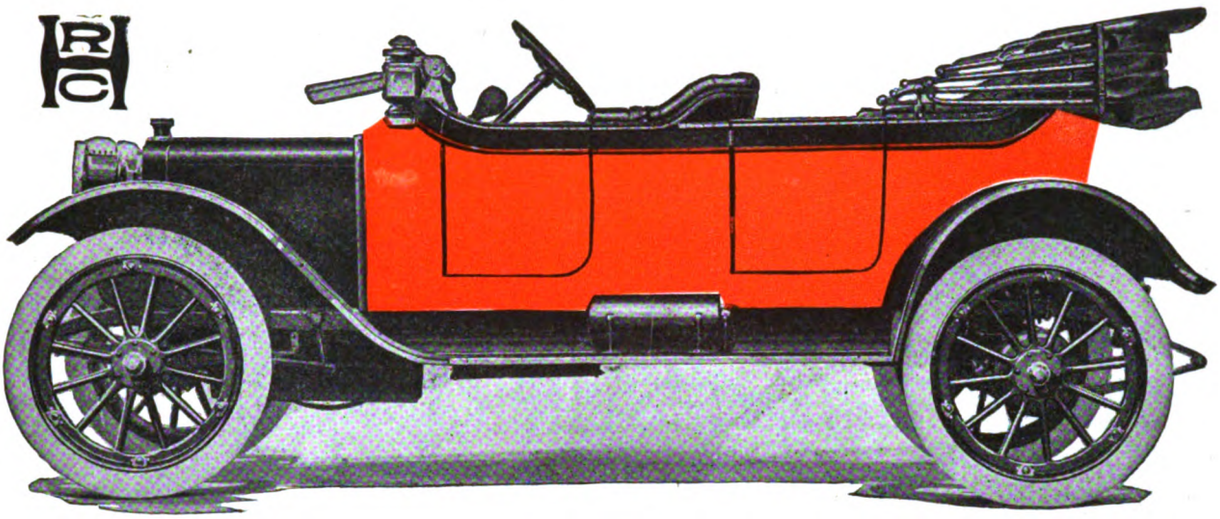
KINSLER-BENNETT COMPANY, Hartford, Conn.
American Distributing Co., Jackson, Mich., Western Sales Agents

"RAJAH" SPARK PLUGS

Ignition Absolutely Sure

RAJAH AUTO SUPPLY COMPANY
BLOOMFIELD, N. J.

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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

R-C-H

"Twenty-Five"

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32 x 3½ tires, demountable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy Curtains, adjusted in an instant, making the car entirely weather proof. Long stroke motor, three speeds, enclosed valves.

STANDARD MODEL

$850 F. O. B. DETROIT

Top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

STANDARD MODEL

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car, except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

General R-C-H Specifications

Motor—4 cylinders, cast enbloc—3¼ inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—left side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

DEALERS who are considering the contract question for the coming season will do well to note carefully the construction and equipment details of the R-C-H.

For the measure of a dealer's success is the number of people he can satisfy with the car he sells.

And the R-C-H covers, far more completely than any other car at near its price, every requirement of the average motorist.

If you will think over what your own customers require in a car, you will see that this is so.

OUR output for the coming year—30,000 cars—will enable us to provide for a country-wide distribution—something we were unable to do with a smaller production this season.

In every county there are prospective R-C-H buyers. It is pre-eminently "the greatest car for the greatest number." It will interest more classes of people than any other car we know.

So we urge that dealers everywhere get in touch with us at once. With R-C-H quality, price, factory co-operation and publicity back of him, an aggressive dealer should find the R-C-H representation the most successful of his career.

R-C-H CORPORATION, 104 LYCASTE STREET Detroit, Michigan

BRANCHES—Atlanta, 548 Peachtree St.; Boston, 563 Boylston St.; Buffalo, 1225 Main St.; Chicago, 2021 Michigan Ave.; Cleveland, 2122 Euclid Ave.; Denver, 1520 Broadway; Minneapolis, 1206 Hennepin Ave.; New York, 1989 Broadway; Philadelphia, 330 No. Broad St.; Detroit, Woodward and Warren Aves.; Kansas City, 3501 Main St.; Los Angeles, 1242 S. Flower St.; Walkerville, Ontario, Canada.

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EXPERIENCE — SHELDON — RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL
"Made in the Largest Axle Factory in the World"

Axle Talk—No. V

The SHELDON axle factory represents a larger investment in equipment than that of any similar factory in the United States.

Its Drop Forge Department is impressive in size and so tremendous and insistent are the shocks of the great steam drop hammers, that miners working several hundred feet under ground distinctly feel the vibration.

Its Machine Tool Departments cover hundreds of thousands of square feet, representing one of the most extensive departments of the kind in America.

The Heat-treating Plant and the annealing furnace for axles, all of course equipped with electric pyrometers, represent an investment of many thousands of dollars.

Our equipment of machines for testing physical and chemical properties of raw materials is in keeping with the magnitude of the plant —the largest in the world.

This plant employs several thousand men, all of them skilled in their various lines of work, and we point with pride to the fact that we have in the forge and hammer departments, mechanics who have served for over twenty-five years—one of the biggest "quality of production" boasts we can make.

Future advertising in this paper, running from week to week, will describe the various products of the SHELDON axle plant.

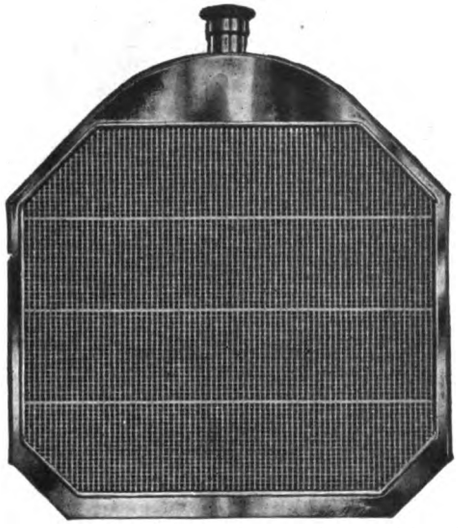
We invite your consideration.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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The Mayo - the radiator thoroughbred

¶ You obtain the utmost in automobile radiators when you buy the Mayo.

¶ Each constructive unit receives individual attention, resulting in a perfect whole.

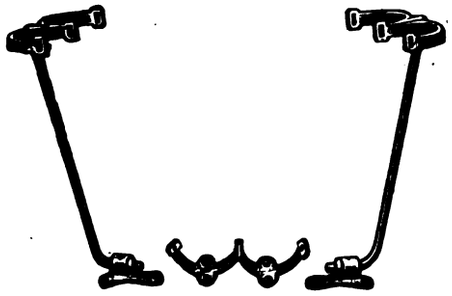
¶ If it were possible to build Mayo Radiators any better we would do it. They combine the latest scientific improvements with highest operating efficiency.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES

"Torpedo" Tire and Demountable Rim Holders



Designed especially for use on Torpedo body or Fore-door cars Set consists of two strong arms firmly bolted to running board and permitting of sufficient adjustment to accommodate two tires or demountable rims, of standard sizes, 4 inch or smaller. Made of solid Brass and guaranteed to give perfect satisfaction.

Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

	Brass	Black
Price, complete with Straps...	$4.00	$3.00

A dozen other styles and sizes in stock. See catalog.

Our 1912 Catalog, which is held as a book of reference by manufacturers, dealers and automobile owners, will be mailed on request. Circulation limited to 100,000 copies.

Chas. E. Miller

MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

HOME OFFICE

97-99-101-103 Reade St., New York City

ORDER FROM NEAREST BRANCH, ADDRESS CHAS. E. MILLER

NEW YORK CITY—97-103 Reade St.
NEW YORK CITY—924 Eighth Ave.
NEW YORK CITY—2782 Broadway.
BUFFALO, N. Y.—824 Main St.
BROOKLYN, N. Y.—1421 Bedford Ave.
ALBANY, N. Y.—135 Central Ave.
BOSTON, MASS.—202-204 Columbus Ave.
HARTFORD, CONN.—274 Trumbull St.
DETROIT, MICH.—227-229 Jefferson Ave.
CLEVELAND, OHIO—1829 Euclid Ave.
PHILADELPHIA, PA.—318 North Broad St.
ATLANTA, GA.—66 Edgewood Ave.
NEW ORLEANS, LA.—601-603 Barrone St.
NEWARK, N. J.—274 Halsey St.
SPRINGFIELD, MASS.—Bridge & Dwight Sts.

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FISK TIRES

HEAVY CAR TYPE

Not What You Pay But What You Get

is the important thing when you buy tires

For fourteen years we have been building high grade tires. From the beginning our reputation for QUALITY GOODS and for FAIR DEALING has been of steady growth.

Our long experience in quality tire building culminated eighteen months ago in a tire whose strength and balance (or equal resistance to wear) had not been paralleled. We had reason to believe that tire to be as near perfection as anything made of rubber and made by man could be.

The intervening year and a half has only strengthened our belief. Regardless of cost, we have held absolutely to the construction and quality then established and are confident we have an unequalled tire.

That is why we have urgently and repeatedly invited investigation of Fisk product before orders were placed. Why we say again that any Fisk user will tell you that our HEAVY CAR TYPE tires hold a phenomenal record for endurance.

That our factory is modern, that our workmen are educated by us to do the work for which each is responsible, that our materials are highest grade, our methods up-to-date and that our experience is of long standing, may be of interest to you, BUT—

The vital fact to YOU is—that we are making tires that are dependable—that we have a strong, balanced construction which means a uniformly satisfactory production—that your neighbor's experience with FISK HEAVY CAR TYPE tires will be YOUR experience.

Look for "HEAVY CAR TYPE" on the wall of every Fisk Tire. This is your guarantee of maximum mileage and longest resistance to wear—results of Fisk Quality materials and this exclusive Fisk type of construction.

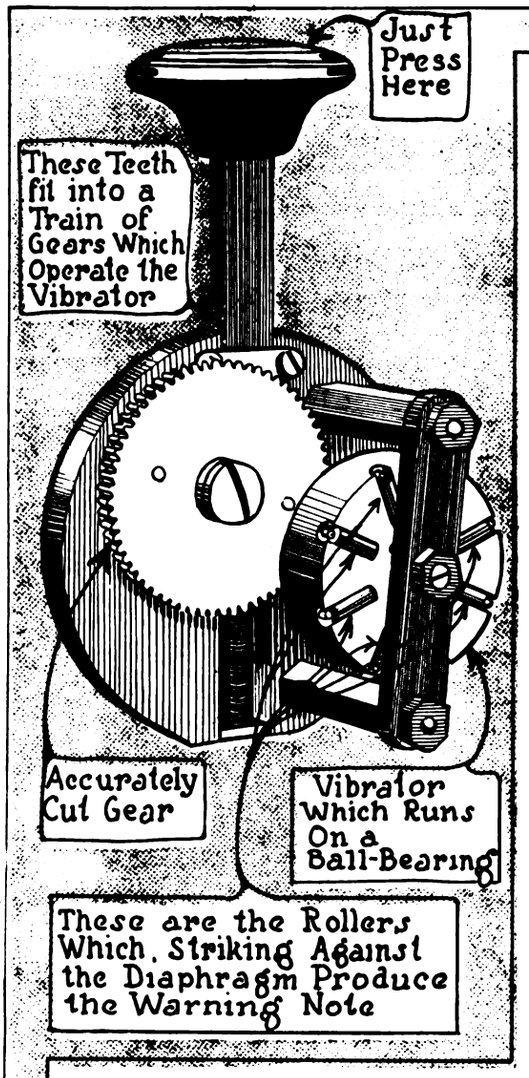
DEALERS: If you desire to work up a healthy tire business in your vicinity, try selling Fisk Tires. You can count on permanent customers after first sale. The value of Fisk Tires cannot be overestimated. Write us today.

THE FISK RUBBER COMPANY

Department 23 **Chicopee Falls, Mass.**

35 Direct Factory Branches

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These are the Parts that Make the THE LONG HORN

The One Ever Dependable and Everlasting Warning Signal that Costs Absolutely Nothing to Operate

THERE must be no element of guess-work or chance of failure in a perfect warning signal. If there is one chance in a thousand that the signal may fail, that one chance may mean a human life.

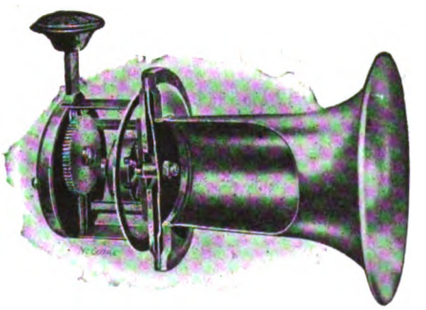
The Long Horn is one hundred per cent perfect. The one chance in a thousand of failure is impossible. So long as the driver is able to push the button, just as surely will the Long Horn issue its warning note loud or low, long or short, as you please.

The Long Horn, as shown by cuts herewith, is a positive, mechanical gear driven piece of mechanism, as certain of operation as time itself. No wires to loosen or break, no batteries to give out or become short circuited, no friction pulleys to slip—nothing but a certain, positive action that is bound to give its warning by the simple process of pushing the button.

There Are a Few More Dealers in Unoccupied Territory Who Can Make Big Money Handling the Long Horn.

The purchase price is about one-third as much as the best electric horn. No further expenditure is required. The Long Horn will outwear your car. The electric horn is a constant expense as batteries deteriorate fast and that one chance in a thousand of failure is always possible.

We have a splendid proposition for wide awake dealers. The margin of profit on each sale is substantial and every Long Horn sold in your territory will bring many repeat orders. We suggest that you get our dealers' proposition for immediate reference. Thousands of motorists are now inquiring for the Long Horn. Maybe your territory is open. Write us immediately.



$18.00

THE G. PIEL COMPANY

13th Street and Boulevard LONG ISLAND CITY, N. Y.

Sales and Attaching Rooms, 51 West 63d Street, Corner Broadway, New York City

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THE MINIATURE MAN

FROM

The Federal Miniature Lamp Works

CAN TELL YOU

Everything about miniature lamps,

their uses and abuses—Why cheap imitations are not cheap—Why the thousands of dollars spent in producing wire drawn filaments were not wasted—What can be made, what cannot and why—The right lamp for the service required.

YOU WILL FIND HIM WELL POSTED

on the subject of **Electric Lighting of Automobiles** and the various systems devised for the purpose.

A specialist who can cure

many of your troubles, not a mere order taker.

If Interested, put your name on his list

by dropping a line to the nearest office.

Federal Miniature Lamp Works

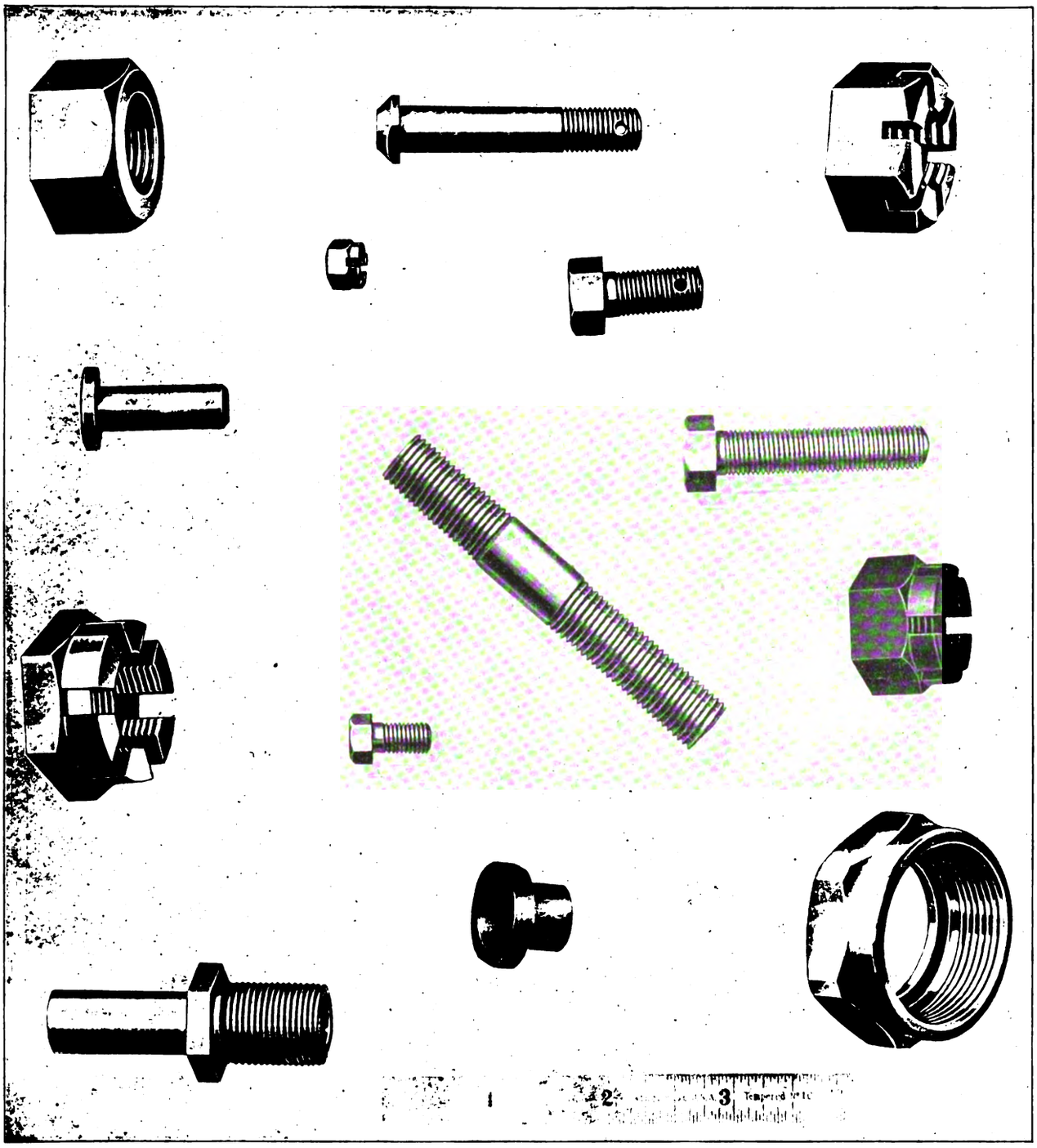
OF GENERAL ELECTRIC CO.

812 Hippodrome Building
CLEVELAND

301 Ft. Dearborn Building
CHICAGO

STOCKS IN BOTH PLACES. FACTORY AT CLEVELAND

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Here are a few of the special nuts and screws which we have been making in large quantities for the auto trade.

¶ They know that serivce means rapid manufacture for quick delivery, parts that fit the gauge and prices that are right. ¶ Upon the merit of these three essentials our machinery is making over one-half of the special milled products which are being used by the automobile manufacturers today. ¶ Send us your samples and let us prove NAMCO service in its completeness. ¶ This is a page from a booklet showing over 200 other special jobs made for the trade. Ask for "Special Milled Products" Book.

THE NATIONAL-ACME MANUFACTURING CO., Cleveland, Sixth City

NEW YORK, 77 White St.
DETROIT, 1222 Majestic Bldg.
FACTORIES: Cleveland, Montreal
BOSTON, 141 Milk St.
ATLANTA, 3rd National Bank Bldg.
CHICAGO, 23 So. Jefferson St.
MONTREAL, St. Henri & G. T. R.
WAREHOUSES: New York, Chicago

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The Niagara Self-Starter

Eliminates Every Doubt



No matter if you stall your motor — the Niagara Starter will start your car every time.

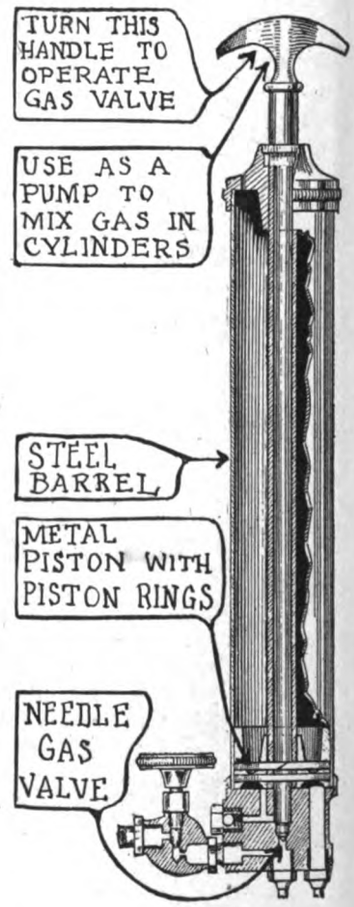
Conditions which render other starters inoperative do not affect the Niagara Self Starter —the starter that always starts.

All complications removed

No starter is so simple as the Niagara. All the "works" are self contained in one unit (see cut herewith) which may be mounted on the dash, under the seat, or on the steering post.

Your customers are looking for such a starter as the Niagara

We have a splendid proposition to legitimate dealers in many localities. You don't have to overload your stock or tie up a lot of money. We'll take all the chances. Just you get in touch with us and we'll show you how to make a good stake in the starter field.

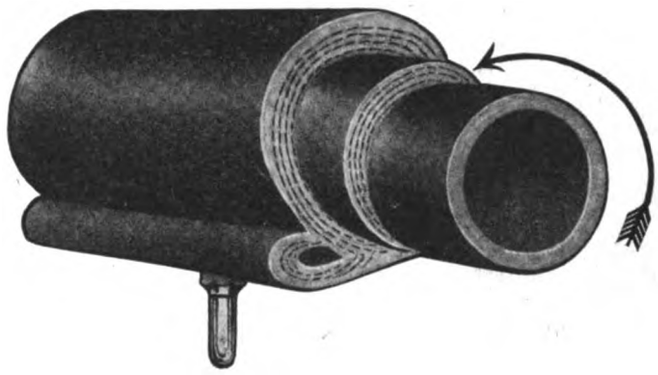


THE NIAGARA SALES COMPANY

704 Main Street **BUFFALO, N. Y.**

"As Dependable As Niagara"

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The cut shows how "Innershu" works —how it protects and saves tires.

But, we do not rest our case on the theory. We offer absolute, bona fide PROOF. Users of "Innershu" know that it

Stops 90 per cent of punctures Prevents blow-outs

Don't accept imitations. Get the genuine "Innershu" with the RED CIRCLE trade-mark shown below. We guarantee permanent satisfaction. There's HOT weather coming. Be free from tire troubles.

Dealers Note These Facts:

We give exclusive territory and we help our agents. Over 2500 dealers now selling "Innershu"—and room for some more. Write and get our complete proposition. The coming HOT weather means more tire troubles than usual. Sell "Innershu" and win the thanks of your trade.

INNER SHOE TIRE COMPANY, Grand Rapids, Mich.

There Is Only One "INNERSHU" The Genuine Bear This Mark

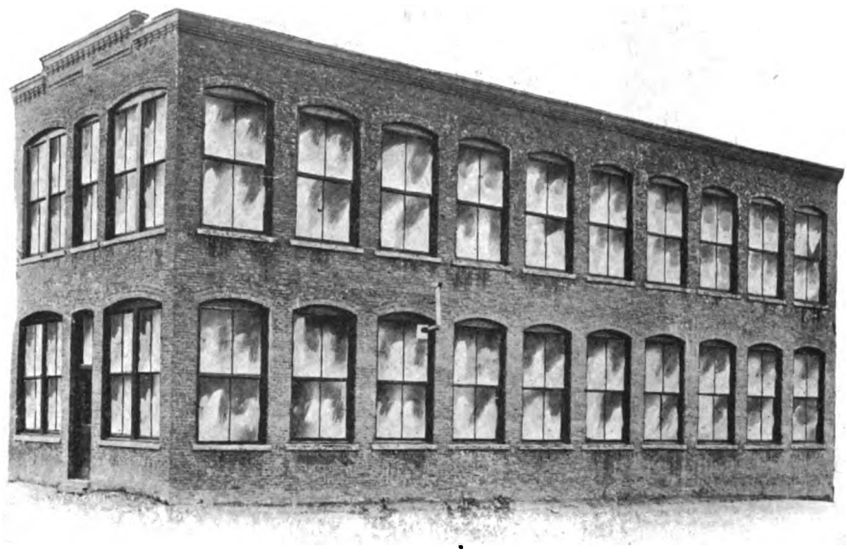
"INNERSHU"

TRADE MARK

Look for the Red Circle Trade Mark. Accept No Other

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New Departure Engineering Building



METALLURGICAL LABORATORY : CHEMICAL LABORATORY
PHYSICAL LABORATORY : HEAT TREATING LABORATORY
ENGINEERING SERVICE DEPARTMENT

Every inch of the large floor space in this building is devoted to two supremely important purposes:

The perfection of New Departure ball bearings by progressive improvements in materials, manufacturing processes and general efficiency of the product.

A study of the practical problems and interests of users of anti-friction bearings, with a constant aim to assist in selecting just the ball bearing equipment that will give greatest efficiency at minimum cost of installation and maintenance.

We have secured an equipment for each department that is not excelled anywhere, particularly with reference to ball bearing manufacture and consultation service.

Our exceptional facilities are yours for the asking. In other words, the co-operation of our entire engineering department is at your command for the selection of the type and size of ball bearings adapted to your design and work. Write us today.

The New Departure Manufacturing Co.
BRISTOL, CONN.

Western Branch, 1016-17 Ford Bldg., Detroit, Mich.

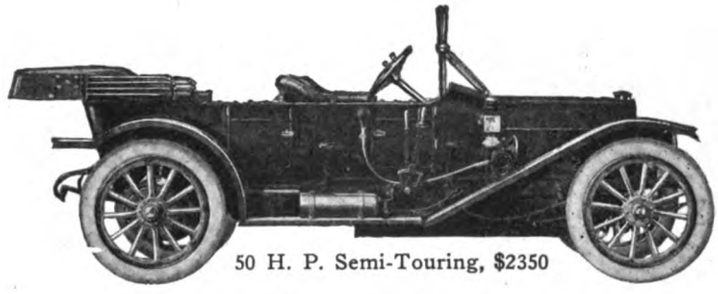
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KISSELKAR

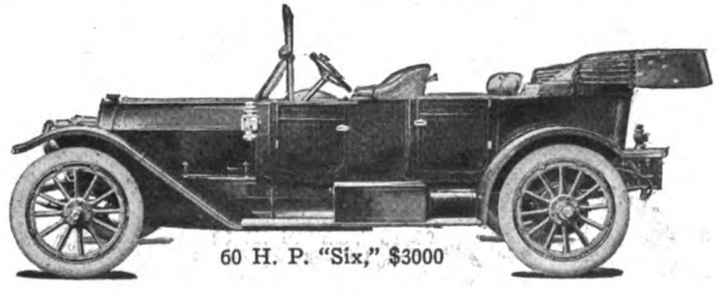
No car can have comfort equal to the KisselKar without the liberal KisselKar wheel base—only a few other cars have it.

No car can equal KisselKar comfort without the same roomy tonneaus, the deep, wide seats—the special KisselKar springy construction, the big wheels and big tires—and these are not to be found so well combined in any car but the KisselKar. The soft, easy riding is exceptional—and the proof is in the riding. Before you buy, ride in a KisselKar.

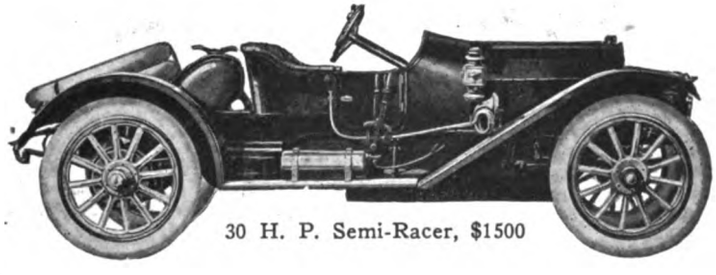
Write for KisselKar catalog.



50 H. P. Semi-Touring, $2350



60 H. P. "Six," $3000



30 H. P. Semi-Racer, $1500

KISSEL MOTOR CAR CO., 159 Kissel Ave., Hartford, Wis.

Flexible Power

No motor exceeds the flexibility of the KisselKar motor. It will drive the car on high at a creeping pace in traffic—climb hills at easy speeds with no need of rushing or it can burn the road with speed. The distinctly superior compression gives the KisselKar motor considerably greater power than most other motors of the same ratings. Perfect balance, accurate workmanship, enclosed valves, and a silent chain cam shaft drive make it perfectly silent in operation.

Thirty . . $1500
Forty . . $1850
Fifty . . . $2350
60 H. P. Six $3000

Service Everywhere

The national service organization maintained by the manufacturers gives completest service to KisselKar owners everywhere. This service organization embraces specially designed and constructed buildings at principal points in America which co-operate with sales agents in giving KisselKar owners every possible service. This system prevents delays for repairs, and secures the fullest motoring pleasures for KisselKar owners at lowest running cost. The following is a partial list of KisselKar Service Centers and Agencies:

Branches and Agencies

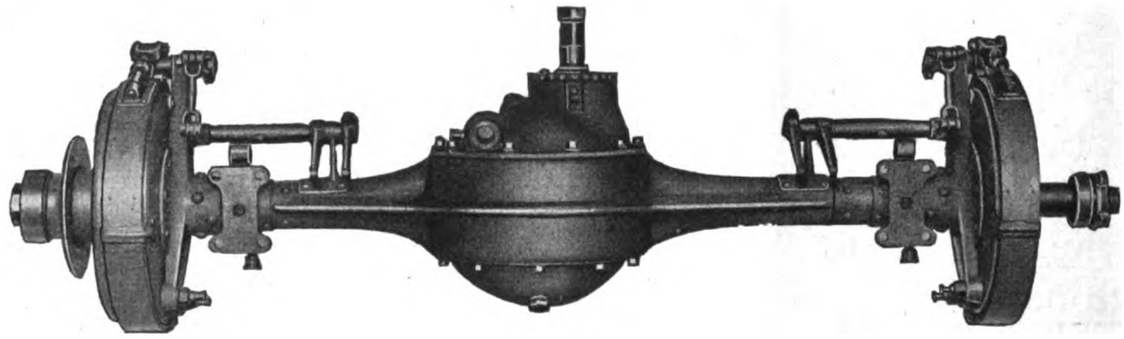
Boston, New York, Chicago, Milwaukee, Kansas City, Los Angeles, Minneapolis, Philadelphia, Cleveland, Detroit, St. Louis, Dallas, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout the United States.

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American American

American Axles

Have Universal Application to Either Gas or Electric Cars Using Bevel or Worm Gears



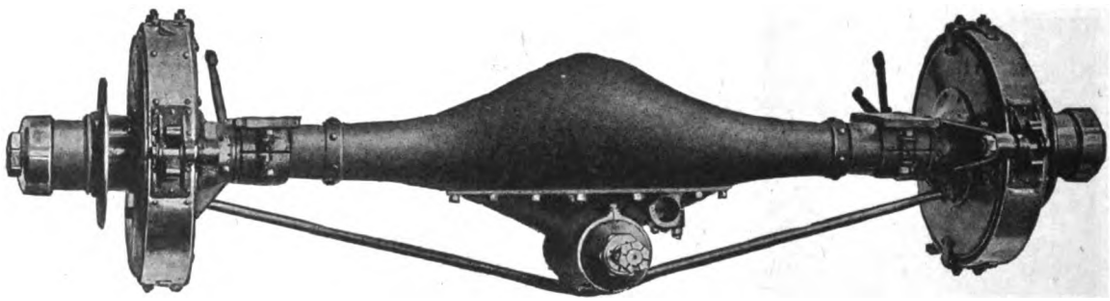
Whatever the type of pleasure car or truck to the equipped, there is an *American* axle for it that demands your consideration because of its sheer merit.

You now have the option of the two types of gear that have won first place in this country and England respectively.

The addition of the Lanchester Worm Gear to the *American* line of bevel gear axles instantly made *American* the synonym for axles of the highest quality for all classes of cars.

For any car weighing up to 4,500 pounds, and up to 60 H. P., there is an *American* axle of superb design, thoroughly tested model and finest workmanship, with either bevel or worm gear.

Through the Warner Gear Co., of Muncie, Ind., we hold the exclusive American rights as axle manufacturers to the use of the Lanchester Worm Drive.



THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Standard Electrical Equipment.

THE electrically equipped car is the best seller now.

¶ For 1913, electrical equipment will prevail, even on the lower priced cars.

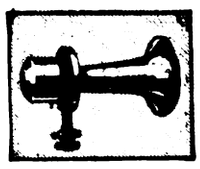
¶ Don't overlook this fact in selecting your warning signal equipment for 1913.

¶ The electric horn has no superior or substitute for ease, quickness and certainty of operation.

¶ The TUTO Electric Horn is best suited for standard equipment as it does all of the signalling of the car with the one horn, one push button, one connecting cord and the regular 6-volt lighting or ignition battery.

¶ The TUTO is the only horn that gives a low service signal for ordinary use and a loud commanding note for emergency use. It is not offensive yet most effective—from the low to the loud note, instantly, with a mere increase of pressure on the button, makes the TUTO Horn most convenient in operation. It is economical in current consumption as the low note takes less than one ampere and is used effectively 90% of the time. It is complete in fittings which go to make a neat and permanent installation and which is devoid of troubles. It is finished in appearance with no unsightly wiring or rough openings left in the car body or frame after its installation.

¶ The TUTO Horn is good enough for the finest car and it does all of the signalling without retaining the old bulb horn. You can't afford to overlook this device when selecting regular equipment for your 1913 models. The TUTO retails everywhere for $25.00 and is an article of class and merit.

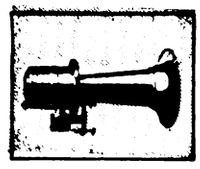


TUTO Horn, $25.00

The Dean Electric Co.

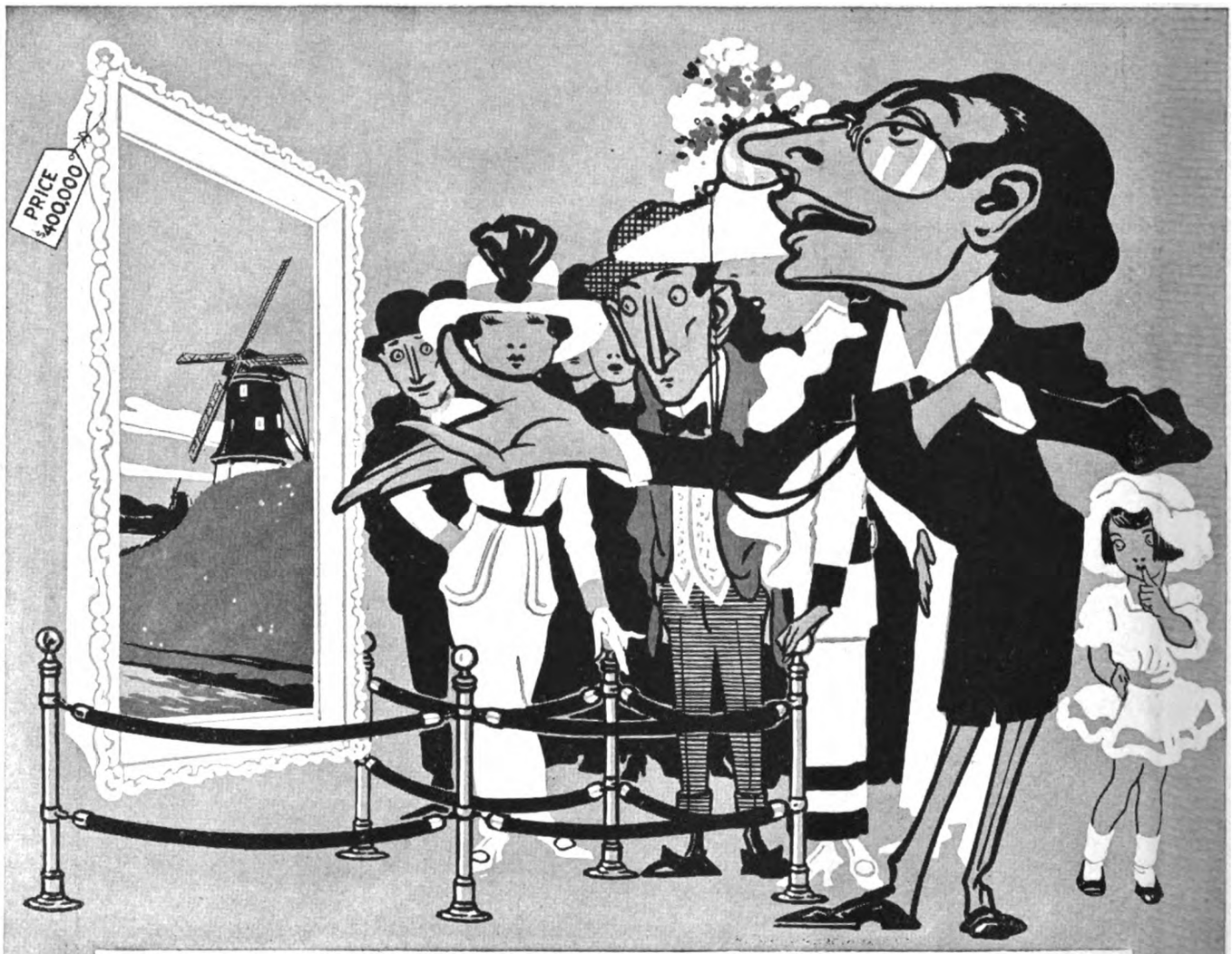
260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

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This Rembrandt "Mill" Sold for $400,000

Cost is *one* thing and value is *another*. *Efficiency* has a measurable price. *Art* is worth what the *purchaser* can be made to *pay*.

The Stewart Speedometer is not an art object, but a mechanical device built for a practical *purpose*. If you are a connoisseur in "objets de virtu," buy the Stewart because of its *beauty*. It is *surprisingly* handsome and *adds* a distinguished touch to *any* car.

But if you are a hard-headed, money counting, value demanding, sensible, logical, hard-pan automobile owner, buy the Stewart because *it makes no mistakes*. It counts *every inch* of travel and records *every second* of time. The rest *can't* be best; the *sale* is the test and the Stewart is on *four* cars out of *five*.



Magnetic principle—jewel bearings—wearing parts hardened and polished; open dial—big figures, easily read—absolutely accurate; 100,000-mile season odometer, 100-mile trip register, can be reset to any tenth of a mile. Guaranteed for five years. Strongest flexible shaft—drop forged swivel joint—noiseless gears.

"ALWAYS ON THE JOB"

Stewart & Clark Manufacturing Company

1928 Diversey Boulevard, Chicago, U. S. A.

Detroit San Francisco New York Los Angeles Chicago Boston Kansas City
Cleveland Philadelphia Minneapolis Indianapolis London Paris

Speedometers, $15 to $30
Rim Wind Clock Combinations, $45 to $70

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4,000 Carloads Wanted

Up to this writing, orders have come to us for over 4,000 carloads of Reo the Fifths. Six cities want trainload lots.

By R. E. Olds, Designer

My Greatest Success

In all the 25 years I have spent building cars I never saw a demand like that for Reo the Fifth.

It is the season's sensation.

Six cities ask for shipments in trainload lots—trains of forty carloads. These are New York, Boston, San Francisco, Los Angeles, Portland and Kansas City.

About 1,000 dealers, in a thousand towns, have already ordered these cars.

After 25 Years

This comes after men, for a quarter century, have driven cars I built.

I told these men that Reo the Fifth embodies the best I know.

I said that it marks my limit, after a lifetime's experience.

And the first announcement brought 12,000 orders from men who have faith in me.

No Undue Haste

In the stress of this demand no undue haste is permitted. I stand here and insist that every car shall be a credit to my reputation.

The parts of each car are ground over and over, until we get utter exactness.

Each car in the making must pass a thousand inspections. Countless parts are discarded because of slight imperfections.

Each lot of steel is analyzed. Engines are tested for 48 hours. Completed cars are submitted to long and radical tests.

The bodies are finished with 17 coats. Not a detail is being slighted.

We could increase our sales $1,000,000 this spring by a little less care in production. But we shall not omit that care.

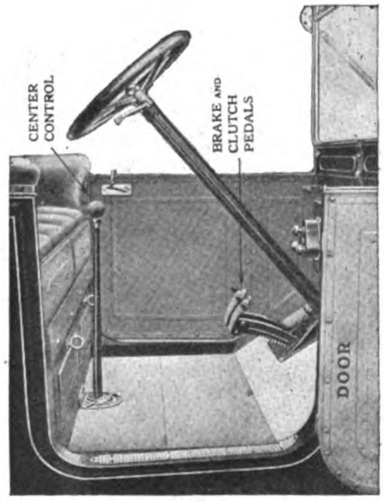
Not for a Season

Reo the Fifth is not built for one season. We count on each car selling 20 cars in the future.

For this car comes close to finality. Men will never be able to greatly improve on it. This factory can never say, "Here is a new model, much better than Reo the Fifth."

With this car I lay down the arduous cares of designing. I end 25 years of ceaseless improvement. I am perfectly content to be judged by this car, whatever may come in the future.

That's why I am watching every car that goes out. We can never claim to better our best, after all this experience. So the future of the Reo depends on this car's performance.



New Center Control

The Year's Greatest Improvement

The new center control in Reo the Fifth marks the greatest step of the year in designing. It solves the last great problem in motor car engineering.

There are no side levers to block one of the front doors. There is no reaching for the brake or the gear lever.

All the gear shifting is done by this center cane-handle. It is done with the right hand, and done by moving this handle only three inches in each of four directions.

Both brakes are operated by foot pedals. One pedal also operates the clutch. There was never a control so handy, so simple.

This arrangement permits of the left side drive, heretofore possible in electric cars only. The driver sits, as he should sit, close to passing cars, and on the up side of the road.

Price Still $1,055

The initial price of this car is still being continued, though subject to instant advance.

This is one feature, I fear, which must be changed before long. Any advance in materials must be added to the price, and that advance is imminent, I think.

I repeat this to avoid any misunderstanding. We shall not advance our price because of over-demand, though that would be easily possible. This car would be cheap ot $1,250—cheaper than any rival.

Added price, when it comes, will be solely due to added cost of production. Our margin is now at the minimum.

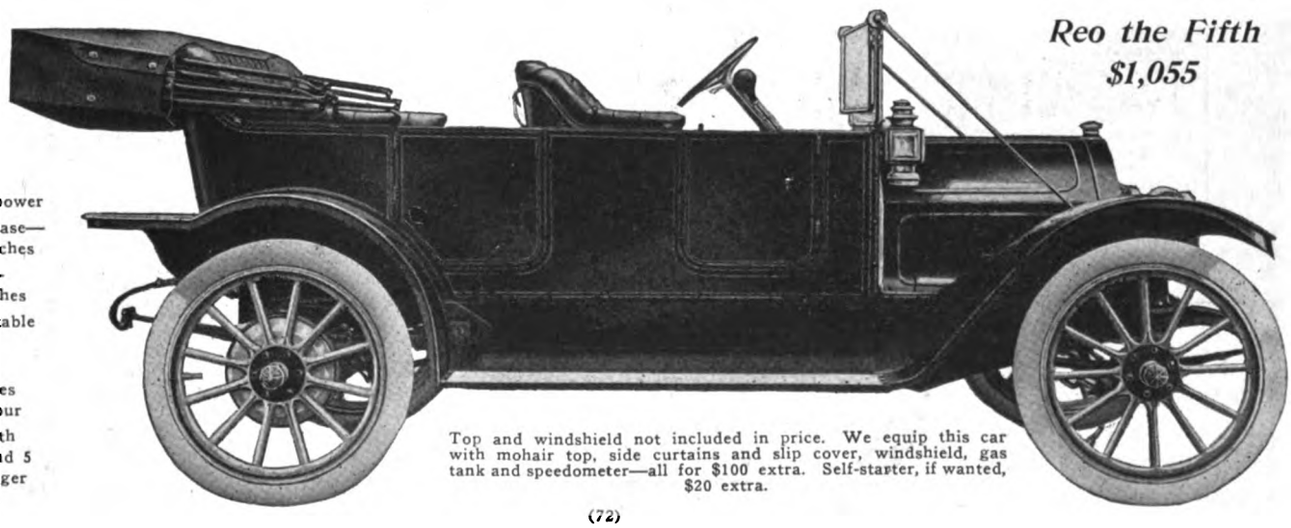
1,000 Dealers

Wherever you are, some dealer nearby you has Reo the Fifth on exhibit.

Write us for our catalog showing all body designs, and we will tell you the nearest dealer. Write us today. Address

R. M. Owen & Co. General Sales Agents for Reo Motor Car Co., Lansing, Mich.

Canadian Factory, St. Catharines, Ont.



30-35 Horsepower
Wheel Base—112 Inches
Wheels—34 Inches
Demountable Rims
Speed—45 Miles per Hour
Made with 2, 4 and 5 Passenger Bodies

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip cover, windshield, gas tank and speedometer—all for $100 extra. Self-starter, if wanted, $20 extra.

(72)

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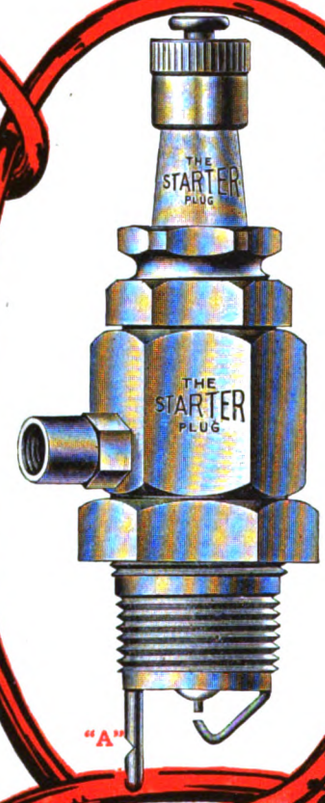
The Connecting Link

Ford · Buick · Stoddard-Dayton · Speedwell · Pope-Hartford · Elmore

The phenomenal success of the DISCO Self Starter has made an enormous demand for some method of equipping those cars which have no petcocks. Here is the connecting link—the new **STARTER PLUG**, with which Fords, Buicks, Stoddard-Daytons, Speedwells, Pope-Hartfords, Elmores, and all other cars without petcocks, are being equipped with DISCO, THE Self Starter—standard equipment for 1912 and 1913.

Simple
Efficient

The Last Word in Equipment



The simplicity of this, the new starter plug, is apparent from the illustration. The acetylene gas with which the DISCO Starter now makes cranking needless on 35,000 cars of all makes, is admitted through jet marked "A." By means of this jet the gas can be directed to secure the most efficient results, depending on the construction of the engine. It is adaptable to any type of cylinder and in any position. Can be used in connection with ANY acetylene starter.

Takes the place of all other spark plugs, and is readily screwed into place, giving the most perfect ignition results and having all the advantages, all the convenience of inspection and cleaning—and all the durability of the best spark plugs made. It is guaranteed absolutely. Patents pending.

Just a Word

TRADE MARK THE STARTER PLUG
MANUFACTURED BY J. E. SCHAEFER
EXCLUSIVELY FOR IGNITION STARTER CO. DETROIT, U.S.A.

This Trademark on every box identifies the big seller and the business getter that YOU want. Remember this new Starter Plug can be used with ANY acetylene gas starter—is the only possible way of applying such starters to the certain makes of cars named above.

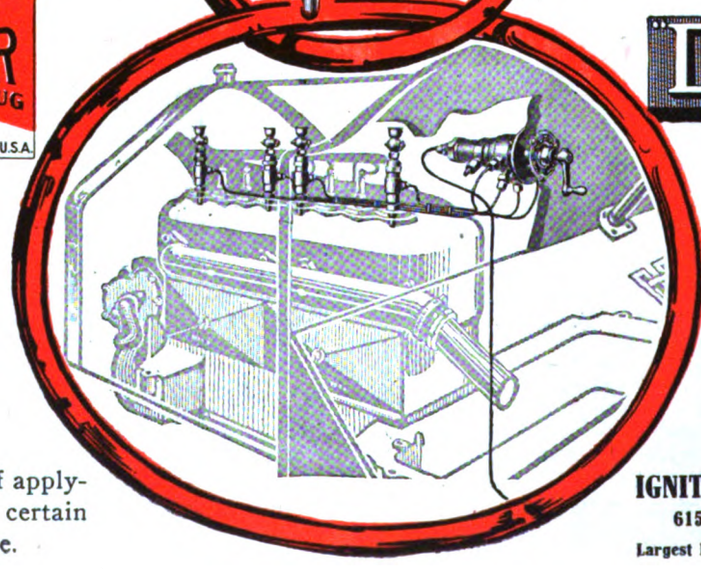
To All Manufacturers, Jobbers and Dealers:

Although we control Basic Patents on this device, we will quote wholesale prices to ANY manufacturer, jobber or dealer, or will send the Starter Spark Plug prepaid to anyone at $1.50 each. Give make and year of car and give name of dealer or jobber.

Make Your Car Up-to-Date

with a Self Starter. This "connecting link" removes the last excuse for denying yourself that luxury and comfort.

to the Trade



DISCO

—THE Self Starter

The small illustration shows why the DISCO Self Starter can be applied to ANY car in a couple of hours by ANY manufacturer, dealer or individual. It has but 12 parts; weighs but 4 pounds, and is now for sale by our 15 branches and dealers everywhere.

We always make prompt shipments; we can arrange for a few more agencies for DISCO Starters and DISCO Lighters. Write us.

IGNITION STARTER CO. Spark Plug Department
615 Dodge Power Bldg., Detroit, Mich.
Largest Manufacturers of Self-Starters in the World

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Timken Bearings and Axles

Win Sweepstakes in "National" Car

Joe Dawson's "National" rode to victory on a Timken-Detroit Front Axle.

The gruelling test at Indianapolis, May 30, proved another triumph for Timken Roller Bearings in the front wheels, the point of severest service, in the rear wheels, at the differential and on the pinion shaft.

No serious accidents marred the race; cars are built better this year than ever before. Ten cars finished the 500 miles.

Five of these had Timken-Detroit Front Axles. They were safe where safety is most essential.

Last year the winning "Marmon" was equipped with Timken Roller Bearings in the front wheels and at the differential.

Timken Axles and Bearings can be counted on to stand up to the most exacting tests.

THE TIMKEN ROLLER BEARING CO.
Canton, Ohio

THE TIMKEN-DETROIT AXLE CO.
Detroit, Michigan

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Studebaker
FLANDERS 20
Studebaker Automobiles
Two Models
E-M-F 30
Studebaker

If You Were an Expert, What Car Would You Buy?

The time has passed when automobiles can be sold to you on their appearances or claims. This is a day when you and every purchaser must be shown what the car for which you pay your money will actually perform; what it will do. Beware of an automobile salesman who attempts to beguile you with a pleasing story. Tell him to show the goods and *prove* to you that his cars are worth the money.. Find out whether his car is a real car or only an assembled automobile built to sell.

You have a right to your money's worth, but it is up to you to see that you get it. Deeper than all appearances, there are a few expert tests which ought to be applied to every car.

Who makes the car? Is it an assembled car or made from top to bottom by one manufacturer? What kind of a guarantee is on it? Does the manufacturer respect his own product with a real guarantee, or does he want you to take the chance? What do parts cost you and how conveniently can you get them? How many cars of this make are in service and how many are giving satisfaction? Questions like these go deep into the heart of the case, and if you put them rigorously upon any car you will find out with a certainty whether or not that car is worth its price.

We are selling Studebaker E-M-F "30" and Flanders "20" cars because we know that, dollar for dollar, their equal is not sold in the market today. The records of many thousands of cars in all kinds of service have convinced us absolutely. Studebaker E-M-F "30" and Flanders "20" cars are built to run. and because they run they sell. If we cannot prove to you under the most searching test that Studebaker cars are absolutely the best automobile values in the market, we do not want your business; but we *can* prove it, and your neighbors who drive these cars will tell you the same thing.

Be an expert when it comes to buying a car. You can, by getting from us some further ideas on real tests of an automobile. Clip the attached coupon and sent it to us now, because we have something new to tell you which you ought to know, whatever car you have in mind.

The Studebaker Corporation

Detroit, Michigan

TEAR OFF HERE

STUDEBAKER CORPORATION, Detroit, Mich.:
I'll be glad to know how you think a man ought to buy a car, if he wants his money's worth.
Name.....
Address.....
.....

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Schafer Bearings

WIN AGAIN AT INDIANAPOLIS

Dawson

DRIVING

NATIONAL

Schafer equipped, won the big Indianapolis 500-mile race, averaging over 78 miles an hour.

Last year the Marmon Wasp, with Schafer Ball Bearings, won this classic event.

Of course there's a reason

BARTHEL, DALY & MILLER

42 Broadway **New York City**

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TOSSED BY ONE AUTO BEFORE PATH OF HIS OWN CAR; SAVED FROM DEATH BY WIFE'S PLUCK

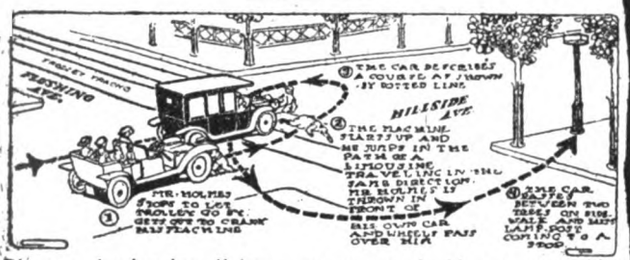


Diagram showing how Holmes was run over by his own automobile.

Herbert Holmes, Wealthy Harlem Undertaker, Seriously Hurt When Touring Car Starts While Cranking—Wife Turns Wheel and Avoids Neck, but Auto Passes Over Body.

But for the remarkable nerve and pluck shown by his wife at a critical moment, Herbert A. Holmes, a wealthy Harlem undertaker, would probably have been killed as a result of one of the most peculiar automobile accidents ever recorded. As it is, Holmes lies now in St. Mary's Hospital ... seriously ... street station and ... Several women were trampled upon during the fight.

what to do. She ... the "plug," but ... As she held ... unruly ca... circl...

R. R. KILLS FOUR AUTOISTS

Three Women Among Victims of Balky Machine, but Driver Jumps.

Martinsville, Ind., May 26.—Four persons, three of them women, were killed at Centerton, near here, to-day when their automobile went dead on the crossing of the Martinsville division of the Indianapolis, Terre Haute & Eastern Traction Company, and was hit by a car. The automobile was thrown into a ditch.

Edda Brown, aged nineteen, was driving the automobile and owes ... life to the fact that he ... he saw he was unable ... ine started ... ed.

Two More Arguments in Favor of the SELF STARTER

THIS part of the advertisement is simply for the information and guidance of the man who does not believe in self starters—but cranking accidents of a serious nature have practically converted the car owning masses to the belief that a self starter of some kind is necessary.

The question, then, remains of selecting the most reliable and efficient device to crank the engine conveniently and safely.

You have been reading masses of advertising covering many complicated and easily disturbed self starters operating through the medium of gas, electricity and compressed air, but in the whole group there can scarcely be found one of these devices that will perform its work under all conditions.

For this reason it is customary for the car owner to carry an old-fashioned crank in his car—proof positive of his lack of confidence in the starter. Now consider the new idea—

The NATIONAL STARTER

does not depend upon any extraneous elements, nor apparatus involving pipes, wires, valves, compressors, coils, etc.

It is simply a mechanical crank with a clever gear arrangement which enables the driver to turn his engine over as many times as is necessary, by a simple foot pressure.

The National Starter is simply a crank in the car—no more, no less.

You can depend upon it that if your engine will not start by the operation of this device, then there is something wrong with the engine—not with the starter. So it is that cars "National equipped" do not carry hand cranks, for you cannot use a hand crank where a National Starter is installed, and you don't need one.

Every dealer and every manufacturer ought to investigate this proposition. It involves more good points than can be encompassed in this advertisement—points of superiority, strength and convenience, never even dreamed of by those who are burning the midnight oil and incidentally their brains in trying to out-do competition in the matter of devising delicate and easily disturbed elemental starters.

We want to go into detail concerning the National Starter and we will be glad to have inquiries. We court fullest investigation of this apparatus. Write today.

NATIONAL GAS ENGINE STARTER CO., 30-32 No. Dearborn St., Chicago, Ill.

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What You Want— & What You Get—

You want to show a profit from your business—to make money.

You want to give your customers the best and quickest service possible.

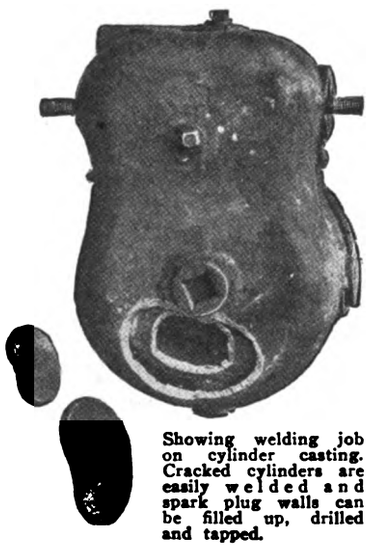
You want to build up your business for tomorrow.

A Prest-O-Welder outfit means sure profits to your business.

Prest-O-Welder saves the delays and cost in waiting for new parts.

Prest-O-Welder means more business for the man who uses it.

PREST-O-WELDER

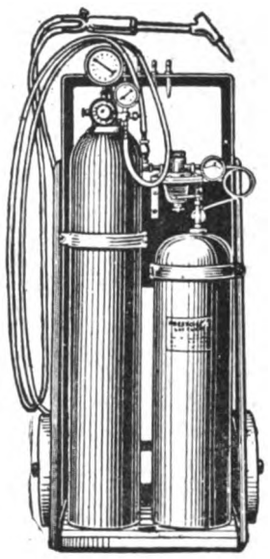


Showing welding job on cylinder casting. Cracked cylinders are easily welded and spark plug walls can be filled up, drilled and tapped.

is a new, compact, portable oxy-acetylene welding outfit—turns on and off like a gas jet—welds cast iron, steel, brass, bronze or aluminum.

In one shop, in one month, $2,538.50 worth of broken parts were made good as new at a total cost of $249.81.

We have a large, descriptive, illustrated book showing actual work done and telling of the construction and operation of this complete outfit. Just say, "Send me the Prest-O-Welder Book today."



The Prest-O-Lite Company

Welding Department

287 W. South Street **INDIANAPOLIS, IND.**

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Diamond Tires

We could build them cheaper But We Won't

We would build them better But We Can't

YOU build a permanent tire busines if you sell Diamond Tires.

¶ Diamond Tires are the largest selling single brand of tires in the world because car owners who have been converted to Diamond Tires, stick to Diamonds.

¶ The customers you make for Diamond Tires will stick to you. And every Diamond Tire user is an enthusiastic plugger for Diamond Tires, always urging his friends to get tire-wise as he is.

¶ There may appear to be a larger one time profit in some other tires, but you cannot afford to be tempted by it. The only safe basis on which to build a business is satisfied and permanent customers.

Do you get our little magazine for dealers? If not you should. Send in your name today.

The Diamond Rubber Company

Akron, Ohio

300 Cubic Inch

MERCER

Wins Third Place in 500-Mile Indianapolis Race

In Field of 24 Starters

Time—6 hrs., 34 min., 56 sec.

Average speed — 75.96 miles per hour.

Bettered last years winner's time by 7 minutes, 12 seconds.

Only One Mercer Car Was Entered. This Car Had Smallest Piston Displacement of Any Car in Race.

The car finishing first had 1½ times the Mercer's piston displacement. The car finishing second had twice the Mercer's piston displacement.

Such facts speak volumes for Mercer efficiency, durability and economy of operation. The Mercer's victory over some of the greatest speed creations of the world is convincing evidence of its desirability for everyday use.

As a prospective buyer, does such wonderful performance appeal to you? Every Mercer car has the same "make good" qualities built into it that made possible the Indianapolis showing.

Send for Catalogue

Mercer Automobile Company

700 Whitehead Road TRENTON, N. J.

NEW YORK, 1802 Broadway
PHILADELPHIA, 620 N. Broad St.

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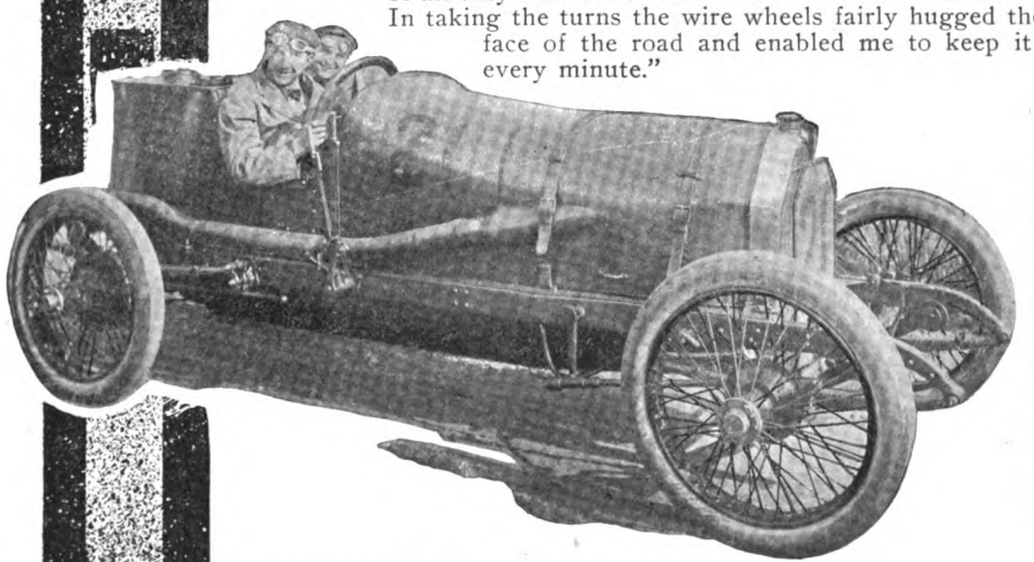
Wire Wheels Helped Me Wonderfully Hughie Hughes

Driver of little Mercer Car, equipped with wire wheels, lays great stress on part those wire wheels played in helping him to win third place in the Indianapolis Speedway 500 Mile Race.

Hughie Hughes, driving a Mercer (the smallest car in the race —piston displacement of only 300 cu. in.), finished in third place, defeating a classy field of racing creations. Many of the motors of these defeated cars were almost twice as large in capacity as the Mercer and this wonderful showing of so small a car was one of the real surprises of the entire race.

That wire wheels increased the car speed may be judged from the statement made by Hughes after the race, as follows:

"Those wire wheels are wonderful. I have never realized how much they helped till this race. In the first place they made the car much easier riding and most important of all they held the car to the track as it never held before. In taking the turns the wire wheels fairly hugged the surface of the road and enabled me to keep it open every minute."



Mercer pitmen say Hughes drew a batch of tires not up to standard for the race because three blew out. Previously he drove over a thousand miles over the track without a blow out. Hughes says with wire wheels he can drive nine out of ten five hundred mile races without a single tire change.

70% MORE TIRE MILES

WIRE McCUE WHEELS

The McCue Company

BUFFALO, NEW YORK

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Overland

DID you ever think of this?

There are nearly as many different automobile prices as there are cars on the market. There cannot be such a wide difference in the manufacturing abilities of the makers to warrant so many different prices. There cannot be so many qualities. What is the secret of the lower price?

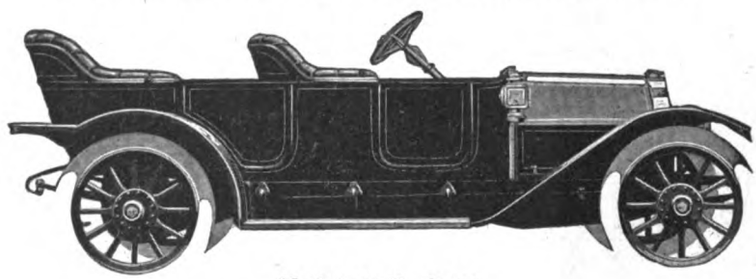
Do a little investigating. Take the Overland Model at $1200. Match it; compare it with all. Search the popular priced field with Model 60 as a "measure."

You discover there are cars, dozens of them, costing $1500, of less value than the Model 60 Overland.

Production methods, you discover, regulate price. We are the largest makers of this type of car in the world. You are privileged to reduce your car's cost by our mammoth production. The smaller maker must charge more for the same value.

Ask for book I-46.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, June 6, 1912. No. 11

TRUCK DEALERS ASK FOR DAMAGES

Their Contract Canceled and Plans Upset, They Take Their Cause to Court—Ewing's Merger Involved.

Flatow, Flinn & Co., of New York City, who contracted to represent the American Motor Truck Co., of Lockport, N. Y., in the metropolitan district during the year 1911 but who, several months after the contract was signed, were notified that their services were unsatisfactory and that the contract, therefore, was canceled, have brought suit in the Supreme Court for New York County to discover exactly what rights they have in the matter and, also, to collect damages.

The suit involves one of numerous mergers which have characterized the automobile trade during recent years, the American Motor Truck Co. having been consolidated in March of last year with the Findlay Motor Co., Findlay, O., when the two became the Ewing-American Motor Co., of which L. W. Ewing is president. The three companies are named as co-defendants in the action brought by the New York firm.

While representing the American truck in New York, Flatow, Flinn & Co. also evolved a plan whereby the business of the New York Mail Co., a mail carrying concern, could be taken over and run with profit with trucks furnished by the defendant company, and this plan was partly or wholly carried out, but in some way or other the complainants allege that others supplanted them in the transaction and that the mail carrying business now is in other hands. This proceeding also enters into the litigation, but just what its effect will be is not made altogether clear. Flatow, Flinn & Co., however, were quite certain that they signed a contract and that they were notified of its cancelation, which cancelation they refused to recognize. After the notice of cancelation, however, they were able to obtain no more American trucks, it being alleged that the defendant companies themselves did business in the Flatow territory and in defiance of the plaintiff's rights in the matter.

Among other things, the complaint alleges that the American Motor Truck Co. is "insolvent and irresponsible," but despite the fact, they ask that it be restrained from selling in the territory covered by the contract, and also that it be required to pay damages.

Simms Magneto Plant Finally Sold.

The sale of the Simms Magneto Co.'s plant in Bloomfield, N. J., which has been pending for several weeks, was consummated this week. Strange to say, however, none of the three other magneto makers who at various times were bidding for the property, figures as the purchaser. Instead, men who are more interested in the production of cars are credited with having secured the plant, but they will not confirm the report and declare that mention of their name will serve only to create erroneous impressions.

Seeks Receiver for De Tamble Motors.

The much troubled and much reorganized De Tamble Motors Co., of Anderson, Ind., is again in hot water as the result of a petition for a receiver filed in the Indiana Superior Court, by the U. S. Ball Bearing Mfg. Co., of Chicago, whose claim amounts to $750. In the petition, it is alleged that the company has permitted its current accounts to go unpaid, that it has a large bonded indebtedness that it cannot meet, and that it is in imminent danger of insolvency.

Chief Creditors to Reorganize Amplex.

Embarrassed by lack of capital to such an extent that it had been forced temporarily to suspend operations, the Simplex Motor Car Co., of Mishawaka, Ind., manufacturer of the Amplex car, has relieved the situation by transferring all of its assets to T. C. Starrett and H. M. Hovey, of Detroit, who are the company's largest creditors. They will pay all its obligations and, meanwhile, are reorganizing the company with increased capital.

N. A. A. M. ORGANIZES SHOW CIRCUIT

Recognizes and Will Support Exhibitions in Only Ten Cities—Special Train To Be Provided.

Not a pruning knife but an axe was wielded by the National Association of Automobile Manufacturers at its meeting in New York yesterday, when the projected local show circuit was moulded into shape. Of the 60 or more local shows which occurred during the past season, and which have become so numerous as to prove embarrassing to the manufacturers, but 10 were deemed of such importance as to be accorded official recognition and sanction.

They are the shows held in Cleveland, New York, Philadelphia, Detroit, Chicago, Minneapolis, Kansas City, St. Louis, Pittsburgh, Boston, Buffalo and Indianapolis, the managers of which had been invited to come to New York to confer with the N. A. A. M. authorities. They are as follows: Louis Block, Philadelphia Automobile Trade Assoc.; T. I. Cochran, Pittsburgh Automobile Show Assoc.; A. E. Doherty, Automobile Show Dealers Assoc., of Pittsburgh; F. W. Payne, St. Louis Automobile Dealers Assoc.; H. E. Pence, Minneapolis Automobile Show Assoc.; W. F. V. Neumann, Detroit Automobile Dealers Assoc.; F. H. Caley and F. C. Wood, Cleveland Automobile Show Co.; Chester I. Campbell, Boston Automobile Dealers Assoc.; H. L. Archey, Indianapolis Automobile Trade Assoc.

When the conference was ended they not only had been assured of N. A. A. M. sanction and support, but the show circuit itself actually had been mapped out and definitely arranged. The national shows in New York and Chicago will constitute a part of the circuit, which, due to the initiative of F. C. Wood, manager of the Cleveland show, will start in that Ohio city January 6th, the dates as arranged being as follows: Cleveland, January 6-11; New

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York, January 11-18; Philadelphia, January 20-25; Detroit, January 27-February 1; Chicago, February 1-8; Minneapolis, February 10-15; Kansas City, February 17-22; St. Louis, February 24-March 1; Pittsburgh, March 3-8; Boston, March 8-15; Buffalo, March 17-22; Indianapolis, March 24-29.

To transport the exhibits and show employes around the circuit, special trains will be provided and uniform rules and co-operative advertising also will be formulated.

A committee of the show managers was appointed to confer with the Motor and Accessory Manufacturers, Inc., in an endeavor to secure their co-operation and sanction of the circuit, which there is small doubt will be readily obtained.

At the N. A. A. M. meeting two new members were elected, the Ideal Motor Car Co., of Indianapolis, and the Auburn Auto Co., of Auburn, Ind. Practically all other proceedings of the meeting were of a routine nature.

"35 Per Cent." Beats Grease Gun Maker.

Although, like some others, William Rubly, of Tuckahoe, N. Y., who manufactures grease buns, repented of a contract which he made with the 35% Automobile Supply Co., of New York, when he was taken into the Supreme Court for New York County last week he found that repentance served no purpose. The court gave the 35 per cent. concern judgment for the full amount asked, $2,383.30. The contract involved was of the same nature as several others which recently have been litigated, in each case in favor of the 35 per cent. company. In return for credit to the extent of $3,360, the 35 per cent. company in the largeness of its heart and acumen agreed to advertise the Rubly products in the monthly circular which it issues, but after Rubly had supplied goods to the extent of $2,106 he decided that the contract was not as angelic as it had appeared and refused to continue further with it. The 35% Automobile Supply Co. then brought suit, and, although the balance due was but $1,254, it was shown that the market price of the goods was about $2,090, and the court awarded the latter sum, plus costs and interest.

Owen-Reo Suit Begins in Detroit.

What is expected to prove an uncommonly hard fought action was begun on Monday last, 3d inst., in the Wayne County Court, in Detroit, when there was called for trial the suit of the Owen Motor Car Co., of Detroit, against the Reo Motor Truck Co., of Lansing, for $5,000 damages. The litigation grows out of the sale of the Owen company to the Reo company in October, 1910, the consideration being, it now transpires, $100,000 in Reo truck stock. The contract, it is alleged, required that the manufacture of the Owen car be continued, and that the receipts from the sales, less 10 per cent., be paid to the Owen company until the latter had discharged all of its obligations. In the meantime, the Owen stock was to be held in escrow. After a lapse of several months, the Reo Motor Truck Co. discontinued the manufacture of the Owen car because, as they now allege, they could not find a market for it. They claim that they paid $1,000 in advertising for every Owen which was disposed of, and as this demonstrated that its profitable sale was impracticable they took advantage of a clause in the contract especially providing for such a contingency and ceased producing the Owen model. It is probable that the trial will last three weeks or more.

Fire Wipes Out the Lion Factory.

Originating from an unknown source, fire early Sunday morning last, June 2nd, totally destroyed the plant of the Lion Motor Car Co., in Adrian, Mich., entailing a loss of about $350,000. It was discovered by the janitor, in the final assembling room, shortly after midnight, but insufficient water pressure after the fire engines arrived enabled the small flame to gain such great headway that the efforts of the firemen were unavailing. One fireman was killed by a falling wall and another seriously injured. The loss is a severe blow to the Lion company, which just about had reached the turn in the long lane which leads to prosperity, and is particularly unfortunate in that it destroyed not only their plant and some 60 cars which were nearly ready for shipment, but also a new $850 model which was being made ready for the 1913 market and all the patterns thereof.

Sourbier Out, Stutz Becomes Ideal's Head.

Harry Stutz, designer of the car which bears his name, has been elected president of the company that makes it, the Ideal Motor Car Co., of Indianapolis. Stutz's upward move is due to the retirement of E. G. Sourbier from the company, of which he was treasurer. He sold his stock to H. T. Campbell, president of the Ideal Motor Car and Stutz Motor Parts companies, and Stutz's elevation to the Ideal presidency followed. J. H. Ebersole, secretary of the company, who is located in Washington, D. C., shortly will remove to Indianapolis and take a more active part in its affairs. Sourbier, who at one time was identified with the Marion company, has no plans for the immediate future, but he expects to remain in the automobile trade.

Gilbert-Republic Rim Suit Settled.

Without public announcement as to the terms, the suit brought a year ago in United States District Court for the Southern District of New York by Joseph M. Gilbert, now general manager for the United States Tire Co., against the Republic Rubber Co., of Youngstown, O., for failure to adhere to a contract to manufacture rims under the Orson L. Pickard patent, No. 771,445, was settled out of court this week, when it was about due for trial. A stipulation by both sides was filed discontinuing the action without costs. The allegation was that Pickard, having obtained his patent October 4, 1904, made an agreement with the Republic company May 16, 1905, whereby he was to receive a certain royalty from the latter for the use of his patent. Part was paid, but he claimed payments stopped prior to October 6, 1906, and that up to October 1, 1909, there was owing him $8,500 with interest. The patent and the account were assigned by Pickard to Gilbert, who brought the action. The defense contended that the contract with Pickard bound him not to transfer his patent or any claim therein to any one other than the Republic company.

Three Studebaker Managers Step Out.

Three more of the Studebaker branch managers have succumbed to the temptations offered by the Metzger Motor Car Co., of Detroit, which is on the point of being enlarged and attracting to itself interests represented by Walter E. Flanders. They are Charles F. Redden, manager of the Studebaker New York branch, who will take charge of the Metzger sales in New York and New England; C. F. Stewart, the Studebaker manager in Des Moines, who will become the Metzger sales manager for the central west, and F. B. Willis, manager of the Studebaker's Indianapolis branch, whose position with the Metzger-Flanders interests has not been made plain. E. LeRoy Pelletier's connection with the advertising department of the Studebaker Corporation also has been terminated. As the trumpet blower of the Flanders forces, it was well known that he would follow Flanders's other "shadow," Paul Smith, into the Metzger camp, but it is understood that it was made unnecessary for him to tender his resignation to the Studebaker people.

Manager Sued for Not "Making Good."

Because he claimed to possess more knowledge than he is said to have displayed, Charles Buek, Jr., of Norwalk, Conn., has been made defendant in a suit for $5,000 instituted in the Superior Court of Connecticut by the Armory Auto Co., of Norwalk, by whom he had been employed as manager. The complaint states that Buek was engaged as the result of representations which he made regarding his ability and his knowledge of automobiles, which, however, is claimed to have proved so lacking that the company was injured in its standing and credit, and otherwise damaged, to the amount for which it has entered suit.

Declares Tire Holder Patent Invalid.

Declaring as his "positive conviction that no claim was made in the patent office which warranted the issuance of the patent," Judge Platt in the United States Circuit Court at Hartford, Conn., on Friday last, 31st ult., bowled out the Fredson E. Bowers patent covering a spare tire holder, which is owned by the Gilbert Mfg. Co., of New Haven, Conn. The decision was rendered in the suit for infringement brought by the Gilbert company against the Post & Lester Co., of Hartford.

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APRIL EVEN BETTER THAN JANUARY

Month of Showers Creates New High Mark for Automobile Exports—Increase Equals 52 Per Cent.

January's glory as the record month for automobile exports was short-lived. During April the foreign shipments attained the value of $2,726,500, which represents an increase of nearly $200,000 on January's figures, and, therefore, stands as the best month in the history of the American automobile industry.

Of the total, $2,280,199 is represented by 2238 cars; the remainder, $446,301, represents the value of parts, which compares with 1,433 cars, valued at $1,463,336, and parts, valued at $46,301, that were sent abroad during April, 1911—an increase of 52 per cent. The average value of cars also advanced from $837 in April, 1911, to $1,018 during the corresponding month of the current year.

Canada again figured as the largest purchaser, its takings being 809 cars, valued at $1,004,638. The next largest purchase stands to the credit of the United Kingdom, which took cars to the value of $463,560, as against $204,768, a gain of more than 100 per cent. Of the ten other geographical divisions, gains were made in Germany, Other Europe, West Indies, South America, British Oceania, and Asia and Other Oceania, the increases in Germany, South America and Asia and Other Oceania being notably substantial. Shrinkages occurred only in France, Italy, Mexico and Other Countries. The shrinkages ranged from $5,526 in Other Countries to $28,883 in Mexico, France and Italy showing respectively $10,346 and $27,511 less than in April of 1911.

The record for the 10 months of the governmental year which ends with June indicates that the value of the exports will approximate $25,000,000. At the end of April they stood at $19,766,495, as against $11,624,045 for the corresponding period of 1911. The statistics in detail are as follows:

Court Quashes One-Sided Contract.

"Lack of mutuality," which is legal language for one-sided contracts, caused the failure last week of an action brought in the New York City Court by Solomon Segall, a Brooklyn dealer, against the New England Top & Body Co., of New York City. The evidence showed that Segall had executed a contract with the New England company whereby the latter agreed to supply him with tops and wind shields as he needed them in his business, but as it did not require that Segall accept any specified quantity, and otherwise was lacking, he was not bound by it. When the New England company discontinued supplying Segall, he instituted suit for $2,000 damages. When the case came to trial, however, he failed to put in a defense, and on the application of the defendant the suit was dismissed for "lack of mutuality" in the contract. Later Segall sought to renew his action, but Judge Finelite last week denied his application for a new trial.

Slight Loss of Tire Exports in April.

The valuation of American tire exports for April, 1912, shows a slight falling off as compared with April of a year ago, the respective figures being $194,132 and $202,233, a loss of $8,101 or about 4 per cent. While the comparative April exports show a lesser figure for the present year, the ten-month periods ending April, 1912, and April, 1911, give a decided increase to the later period. The value of American-made tires exported to foreign countries for the ten months ending with April last is $2,063,603, a gain of $535,467, or about 35 per cent. over $1,528,136, the valuation of the exports for the ten months ending April, 1911.

Receiver for Relics of Lost Project.

R. E. Proctor was last week appointed receiver for the H. H. Elmer Co., of Elkhart, Ind., under nominal bond of $300. The Elkhart company was the outgrowth of the Elmer Auto Corporation, which took over the plant of the bankrupt Elkhart Motor Car Co. and which became involved in such many-sided litigation that the Elmer project was abandoned.

S. A. E. TO MEET ON LAKE HURON

Two Days of Mid-summer Meeting to be Spent on the "Bounding Billows"—Subjects to be Discussed.

All announcements, not excepting the official announcement, that the midsummer meeting of the Society of Automobile Engineers will occur in Detroit June 27th, 28th and 29th prove to have been less than half true. As the program for the meeting has developed to a point of definiteness, it has been made plain that at least two-thirds of the proceedings will occur not in Detroit, or, on any other land, but on the heaving bosom of Lake Huron, aboard the good ship City of Detroit No. 2. Only the more or less formal business meeting on Thursday morning, 27th inst., and the usual visits to factories during the afternoon of the same day will be held on land, as late Thursday evening the engineers will embark on the steamer City of Detroit No. 2, which at 8 P. M. will sail to Mackinac Island, at the head of Lake Huron. The party will not return to Detroit until the following Saturday night.

Apart from the fun which is barely hinted at, the two days afloat will be devoted to "professional sessions," at which the reports of various committees will be rendered and the technical papers, which are a part of all S. A. E. meetings, will be read by their authors. The papers already programmed are as follows:

"The Effect of the Relation of Stroke and Bore in Automobile Engines," by John Wilkinson; "Motor Sizes and Drive Ratios for Commercial Vehicles," by E. P. Batzell; "Cost of Work with Gasoline Motor Trucks," by Louis Ruprecht; "Stability of Automobile Propeller Shafts," by J. M. Thomas; "The Standardization Work of the S. A. E.," by Henry Souther, chairman of the Standards Committee; "An Exhaustive Motor Test," by Herbert Chase (introduction by F. R. Hutton); "Tests of Aluminum Alloys," by H. W. Gillett; "Worm Gears," by Frank Burgess; "Helical Gears," by Frank Burgess; "Standard-

	April				Ten months ending April					
	1911		1912		1910		1911		1912	
	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.
Automobiles	1,433	$1,463,336	2,238	$2,280,199	4,867	$6,418,882	8,783	$9,748,630	16.807	$16,470,147
Exported to—										
United Kingdom		204,768	579	463,560		1,551,576		1,862,758	4,716	$,765,765
France		77,029	104	66,683		482,855		422,251	444	370,836
Germany		26,072	64	46,735		154,793		211,771	212	153,721
Italy		43,692	21	16,181		289,818		174,399	139	122,247
Other Europe		114,902	169	132,093		247,087		557,178	858	715,186
Canada		921,242	809	1,004,638		3,057,456		4,805,689	4,424	5,181,232
Mexico		51,174	16	22,291		455,957		596,815	258	394,759
West Indies and Bermuda		32,201	43	34,415		394,387		343,433	270	282,381
South America		93,637	131	167,911		275,120		687,921	1,282	1,553,629
British Oceania		130,905	134	137,124		307,312		1,036,589	3.034	2,725,047
Asia and Other Oceania		57,363	140	160,215		245,743		672,013	849	889,368
Other countries		33,879	28	28,353		133,211		253,228	321	315,976
Parts of (except tires)		323,528		446,301		1,176,433		1,875,415		3,296,348
Total		$1,786,864		$2,726,500		$7,595,315		$11,624,045		$19,766,495

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ization of Drawings," by George W. Dunham; "Test of a Knight Motor," by R. C. Carpenter; "Leaf Springs," by Leavitt Lane.

The standards committees which will render reports are as fololws: Broaches Division, C. W. Spicer, chairman; Carbureters Division, G. G. Behn, chairman; Data Sheet Division, C. P. Poole, chairman; Frame Sections Division, J. G. Perrin, chairman; Iron and Steel Division, Henry Souther, chairman; Miscellaneous Division, A. L. Riker, chairman; Sheet Metals (Aluminum), T. V. Buckwalter, chairman; Springs Division, Harold L. Pope, chairman; Truck Standards Division, W. P. Kennedy, chairman.

The S. A. E. will have exclusive use of the steamer City of Detroit during the trip to Mackinac Island and return, for which a reduced rate of $15 has been granted. That sum covers transportation, meals and berth, and as the boat is one of the largest passenger vessels on the lakes, advance reservations by the engineers will not be necessary.

Ashore, the Pontchartrain Hotel will be the official headquarters, and it is left to the members of the society to reserve their own accommodations, either in that hotel or any of the others of which the city boasts.

The Detroit committees which will have charge of the proceedings ashore and afloat are as follows:

Entertainment: H. E. Coffin, Hudson Motor Car Co., chairman; H. W. Alden, Timken-Detroit Axle Co.; Russell Huff, Packard Motor Car Co.

Finance: E. T. Birdsall, chairman; Mason P. Rumney, Detroit Steel Products Co.; Tracy Lyon, General Motors Co.

Transportation: F. H. Floyd, chairman; E. E. Sweet, Cadillac Motor Car Co.; H. R. Corse, Lumen Bearing Co.

Hotels: G. W. Dunham, Chalmers Motor Co., chairman; F. H. Berger, Oakland Motor Car Co.; J. G. Vincent, Hudson Motor Car Co.

Lozier Abandons Truck Manufacture.

After having manufactured several attractive 5-ton vehicles, the Lozier Motor Co., of Detroit, unexpectedly has withdrawn from truck manufacture, and will again devote itself wholly to the production of cars. After having the work well in hand, the Lozier people discovered that the manner of guarantees and competition that prevails in the truck industry is not of the sort to make it attractive or profitable, at this time, at any rate; hence their withdrawal from the field.

First Dividend for Grabowsky Creditors.

The Grabowsky Power Wagon Co., of Detroit, which two months since was taken over by a creditors' committee, which is running the business, yesterday paid a first dividend of 10 per cent. Louis Bolton is acting as general manager of the company in the interests of the creditors.

LOCOMOBILE'S REFINANCING PLAN

Increase of Capital and Bond Issue Provided For—Resources and Condition Disclosed by Public Statement.

Friday, June 14th, has been set as a new date for the meeting of the stockholders of the Locomobile Co. of America, Bridgeport, Conn., at which its proposed increase of capital and issue of bonds will be considered. As the meeting is largely a matter of form, it is certain that the capital will be increased from $5,000,000 to $6,500,000, and that the proposed issue of $1,500,000 in mortgage bonds and $2,500,000 in debentures will be authorized.

Of the present Locomobile capitalization $1,500,000 is represented by preferred stock and $3,500,000 by common, all of which is outstanding. The added capital will be made up wholly of 15,000 shares of common stock which, according to the pending resolution, may be sold at one-quarter of its par palue or any part thereof.

The bonds that will be issued will consist of $1,500,000 6 per cent. ten-year first mortgage bonds, and $2,500,000 6 per cent. twelve-year debentures, all of which have been underwritten by Spencer Trask & Co., of New York. They are redeemable, in whole or in part, at 105 and interest on any interest date, interest being payable June 1st and December 1st.

There will be created a sinking fund of $150,000 per annum, of which $100,000 is obligatory and must be paid over and above the interest on the first mortgage 6 per cent. bonds, the remaining $50,000, or any part thereof, only to be paid if earned. If any part of the remaining $50,000 is not earned and paid during any one year, the unearned balance shall be added to the sinking fund of the following year, or years, to be paid as earned. Out of its surplus earnings, the company will create also a reserve fund of $250,000, which fund will be available to meet its fixed charges, "if by any possible chance current earnings should ever be insufficient." The company agrees also that net quick assets of 150 per cent. of total outstanding bonds will be at all times maintained, and that none of its fixed assets will be disposed of unless the proceeds thereof are used to retire bonds for the sinking fund.

If, after providing for interest and sinking fund on the first mortgage 6 per cent. bonds, interest on the 6 per cent. debenture bonds, the reserve fund, and 7 per cent. dividends on the preferred stock, any dividends are paid on any class of stock other than the $1,500,000 preferred stock, the company shall pay an amount equal to one-half of such dividends to the trustee, the money to be used as an additional sinking fund for the purchase of further amounts of first mortgage 6 per cent. bonds, or for new property and permanent improvements.

On the basis of the company's statement for the year 1911, its financial condition (after the adjustment through sale of $1,500,000 first mortgage 6% bonds to the bankers, and $1,000,000 twelve-year 6% debentures to the controlling interests for cash) would be: Net quick assets, $2,635,352.34; total net assets (exclusive of patents, good-will, etc., estimated on a conservative basis at $5,000,000), $4,257,891.

The earnings for the year ended December 31, 1911, as applied to the new financing, would show as follows:

Net earnings, after depreciation and maintenance	$563,000
Less bond interest first mortgage 6s	90,000
Balance	$473,000
Sinking fund first mortgage 6s	150,000
Balance for 6 per cent. debentures	$323,000
Interest requirements on debentures	60,000
Surplus over debenture interest	$263,000
Application to dividends on preferred stock (7 per cent. on $1,500,000 preferred)	105,000
Surplus over preferred dividend requirement	*$158,000

*Should any part of the remaining surplus earnings in any year ($158,000 for 1911, as shown in the above statement) be used for dividend purposes, an amount equal to one-half of such dividend must be applied to sinking fund or reserve fund.

The net earnings for seven and one-third years ended December 31, 1911, averaged $347,520.54. The company estimates that for 1912 the net earnings should exceed $700,000.

For the last seven and one-half years the output of cars averaged 723 per annum. The 1913 campaign contemplates an output of approximately 1,200 cars, which will sell for the most part at $3,600 and $6,200 each, respectively, being an increase over the price of the 1912 cars.

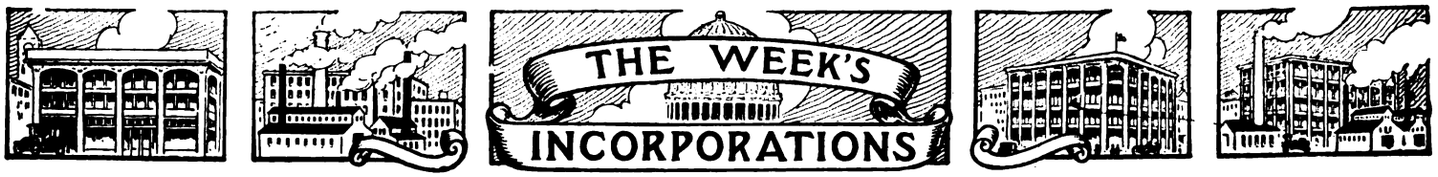
The prospectus offering the mortgage bonds for sale, which makes public these figures, also discloses that J. J. Albright, vice-president of the Marine National Bank of Buffalo, is the largest individual stockholder in the Locomobile company.

In underwriting the mortgage bonds, Spencer Trask & Co. required that the Locomobile company should sell $1,000,000 of the twelve-year 6 per cent. debentures at not less than 90 and interest, and that the entire cash proceeds from the sale of the ten-year 6 per cent. bonds and $1,000,000 of the 6 per cent. debentures be placed in the treasury of the company.

Reo Resumes Payment of Dividends.

Having passed its dividend since June, 1910, the Reo Motor Car Co., of Lansing, Mich., last week resumed payments to its stockholders. It then declared a dividend of 10 per cent.

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Buffalo, N. Y.—Autoaro Pump Co., under New York laws, with $1,000 capital; to manufacture tire pumps.

Chicago, Ill.—Star Motor Delivery Co., under Illinois laws, with $75,000 capital; to operate a motor delivery.

Long Beach, Cal.—California Co-Operative Co., under California laws, with $150,000 capital; to deal in motor cars.

Nashua, N. H.—City Garage Co., under New Hamphsire laws, to operate a garage. Corporators—John K. Martin and others.

St. Louis, Mo.—American Automobile Insurance Co., under Missouri laws, with $200,000 capital; to conduct an automobile insurance business.

Cambridge City, Ind.—Auto Inn, under Indiana laws, with $10,000 capital; to deal in motor cars. Corporators—Abiram Boyd, J. L. Boyd and others.

Keokuk, Ia.—Water Power Garage Co., under Iowa laws, with $4,500 capital; to operate a garage. Corporators—W. J. Harter, W. D. McLellan, C. H. Dodge.

Asheville, S. C.—Auto Sales Co., under South Carolina laws, with $25,000 capital; to deal in motor cars. Corporators—E. T. James, John G. Weber, J. A. Rose.

Ogdensburg, N. Y.—Crescent Garage Co., under New York laws, with $6,000 capital; to operate a garage. Corporators—John O. Spear, Charles W. Weed, William Golden.

Huntington, Ind.—Big Four Auto Co., under Indiana laws, with $3,000 capital; to deal in motor cars. Corporators—Daniel Shinkel, Louis Shinkel, William Richardson.

Chicago, Ill.—Chicago Ferromatic Tire Co., under Illinois laws, with $10,000 capital; to manufacture tires, etc. Corporators—B. N. Carter, H. C. Flemming, E. J. Kneip.

Charleston, S. C.—Robinson Automobile Co., under South Carolina laws, with $20,000 capital; to deal in motor cars. Corporators—J. T. and B. F. Robinson and others.

Camden, N. J.—General Auto Co., under New Jersey laws, with $50,000 capital; to deal in motor cars. Corporators—Frank A. Kuntz, F. Stanley Sturman, Frank S. Muzzey.

Chicago, Ill.—Ohio Motor Car Distributing Co., under Illinois laws, with $5,000 capital; to deal in motor cars. Corporators—Joseph Slottow, Samuel G. Wood, Fred C. Churchill.

Albany, N. Y.—Boulevard Garage Co., under New York laws, with $50,000 capital; to manufacture automobiles. Corporators—Morris Ryder, Samuel W. Whitney, Horace A. Rayno.

Huntington, N. Y.—Bergen Garage, Inc., under New York laws, with $5,000 capital; to operate a garage. Corporators—A. Schenck Bergen, Howard W. Doughty, John H. Doughty.

New York, N. Y.—Resilio Tire Co., under New York laws, with $100,000 capital; to manufacture tires. Corporators—Edgar T. Wallace, T. S. Williamson, L. H. Starkey, all of 71 Broadway.



NEWLY ACQUIRED FACTORY OF THE HENDERSON MOTOR CAR CO., IN INDIANAPOLIS, IND.

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Toledo, Ohio—Peerless Rubber and Tire Co., under Ohio laws, with $10,000 capital; to manufacture tires. Corporators—R. G. Wierman, John T. Hickman, Edward Unbstaetter, J. R. Humphrey.

Chicago, Ill.—Auto Utilities Manufacturing Co., under Illinois laws, with $10,000 capital; to manufacture automobile specialties. Corporators—John F. Decker, Belle Bellew, Arthur M. LeWald.

Cleveland, Ohio—Eiseman Automobile Co., under Ohio laws, with $10,000 capital; to deal in motor cars. Corporators—Sidney N. Weitz, John W. Camp, Harry Pott, N. Cummings, Frank Boehmer.

New York, N. Y.—Mercedes Selling Branch Co. of America, under New York laws, with $5,000 capital; to deal in motor cars. Corporators—Jacques I. Woldenberg, Edmond R. Lyon, Jacob Kooperstein, all of 258 Broadway.

New York, N. Y.—Parker Garage Co., under New York laws, with $3,000 capital; to operate a garage. Corporators—Charles T. Green, 30 Pinehurst avenue; Edwin T. Griffin, 337 West 14th street; Ernest Morrison, 280 Nicholas avenue.

Penn Yan, N. Y.—Beckwith Trucking Co., under New York laws, with $10,000 capital; to deal in automobiles and supplies. Corporators—H. Allen Wagner, 175 Main street; Jay Beckwith and Grace E. Beckwith, both of 119 Sheppard street.

New York, N. Y.—Yellow Taxicab Co., under New York laws, with $5,000,000 capital; to operate taxicabs. Corporators—Albert F. Rockwell, Bristol, Conn.; Robert C. Watson, 105 West 155th street; William M. Lybrand, 55 Liberty street, both of New York City.

New York, N. Y.—Gotham Sporting Goods Co., under New York laws, with $10,000 capital; to deal in automobile supplies, etc. Corporators—Benjamin Goodman, 354 Franklin street, Buffalo; Henry Ephriam, 57 Warren street; Ben. Stacy, 526 West 158th street.

New York, N. Y.—Gas Engine Self Starting Co., under New York laws, with $1,000 capital; to manufacture motor starters. Corporators—George M. Auten, 267 Lenox Road, Brooklyn; Henry C. Farnum, 411 55th street, Brooklyn; Lemuel C. Altemus, Germantown, Pa.

Recent Losses by Fire.

Lorain, O.—F. S. Rathwell, garage and eight cars destroyed. Loss, $10,000.

Buffalo, N. Y.—Warren Lubricant Co., plant and contents ruined. Loss, $140,000.

Adrian, Mich.—Lion Automobile Co., factory and equipment destroyed. Loss, $200,000.

McGregor, Tex.—McGregor Machine & Auto Co., building and contents destroyed. Loss, $11,000.

Buffalo, N. Y.—William H. Lee, 108 Brayton street, garage and storehouse, destroyed. Loss, $7,500.

Memphis, Tenn.—Jack Suth, 162 East Court avenue, garage and four cars destroyed. Loss, $14,000.

Hartford, Conn.—Buick Garage Co., 366 Main street, garage damaged, 100 tires and seven cars destroyed. Loss, $25,000.

Changes Among Prominent Tradesmen.

A. M. Pearson has been appointed manager of the Locomobile truck department for the cities of Philadelphia, Baltimore and Washington, in which cities he will divide his time. Previously Pearson was connected with the Packard, White and Gramm companies.

Walter H. VanDusen has been appointed assistant sales manager for the Abbott Motor Co., of Detroit. He at one time was sales manager for the E. R. Thomas Motor Co., of Buffalo, but latterly has been connected with the sales department of the Chalmers Motor Co., in Detroit.

Berry Rockwell, who both before and since the organization of the United States Motor Co. directed the Maxwell-Briscoe advertising department, has been appointed advertising manager for the entire United States Motor Co. He succeeds Gridley Adams, who resigned to join the advertising staff of the Aeolian Co.

Harry Bill, general manager for the Metzger Motor Car Co., of Detroit, has resigned that office to take charge of the automobile department of the Tudhope Carriage Co., of Orilla, Ont. Bill already has assumed his new duties, which are not wholly strange to him, as the Tudhope company manufactures the Everitt car in Canada.

Tom L. Marshall has been appointed acting sales manager for the Marion Motor Car Co., of Indianapolis, Ind., in which he also has acquired a stock interest. He has been identified with the industry, chiefly with the Maxwell-Briscoe interests, since 1905, and it is probable that when the reorganization of the Marion company is fully completed he will go higher up the ladder.

McAdamite Metal Cannot Escape Suit.

Despite the fact that the British Aluminum Co., Ltd., is a foreign corporation and, according to the laws of New York is prohibited from maintaining any action in court on a contract made in the state, those allegations have not served to exempt the United States McAdamite Metal Co., of New York, from the suit instituted in February last by the British corporation for $4,368, plus interest and costs. The case involves a contract for 100 long tons of aluminum, of which 35 tons were delivered and paid for up to December 31st last. The McAdamite company refused to accept further deliveries, and the English company brought suit for the amount stated, which represents a shrinkage of 3½ cents per ton on the 65 tons undelivered which had occurred after the contract had been executed. The McAdamite company made a motion to vacate the attachment which had been levied, which motion, when denied by the New York Supreme Court, was carried to the Court of Appeals, which late last week upheld the lower court, the court expressing the opinion that the papers upon which the attachment was granted contained competent and sufficient proof that the plaintiff is entitled to recover the sum sued for and dismissing the objection that the plaintiff is a foreign corporation as not well taken.

Asks Damages for Misuse of "Gordon."

Claiming that the sales of its goods, marked "Gordon," have been greatly decreased by the substitution for them of other and inferior articles at lower prices catalogued as Gordon goods, the Vehicle Apron and Hood Co., of Columbus, O., makers of tires and trunk covers, etc., has singled out the National Auto Supply Co., of New York City, and this week began suit in United States District Court for the Southern District of New York, alleging unfair competition and asking that besides being enjoined from substituting further the defendant company be compelled to pay punitive or exemplary damages of $10,000. The Ohio company states its sales in 1911 fell off about 25 per cent., after large increases in the five preceding years, although the 1911 advertising appropriation was trebled. It states it already is possessed of an injunction against the American Tire and Rubber Co., of Chicago, but that unless damages are attached to a verdict, making it an efficient trade weapon, the complainant will be "caused to abandon all dealing in automobile accessories."

Miller Carburetter Secures Indiana Factory.

The New Miller Carburetter Co., which recently decided to locate in Indianapolis, Ind., has established its factory and general offices in the Murphy Building on East Georgia street in that city. The officers of the company are F. C. Fairbanks, president; A. W. Nash, vice-president, and K. K. Parrot, secretary. The active management of the company will be in the hands of L. H. Colvin, former sales manager for the Warner Mfg. Co., of Toledo, O., who has been appointed general manager of the New Miller company. The Miller carburetter is a California product which has been on the market for several years. It will be continued in its old form, but the output will be greatly enlarged, the Indianapolis factory having a capacity for over 70,000 carburetters per annum.

Roberts Heads Ware Four-Wheel Drive.

L. E. Roberts, for fifteen years sales manager for the Computing Scales Co., of Dayton, O., has been elected president of the Ware Motor Vehicle Co., of St. Paul. The company manufactures a four-wheel drive truck, and it is expected that Roberts's election will bear almost immediate fruit in the form of a larger factory and, of course, a larger output.

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L. A. Keene is about to erect a garage, 36x60 feet, in Waterman, Ill.

W. W. Braren, Peoria, Ill., has sold his garage business to Fred J. Poshard.

Pursley & Stark, Long Beach, Cal., are building a garage; it will cost $4,000.

H. L. Triplett, of Whittier, Cal., has engaged in the garage business in Downey, Cal.

J. H. Still and his son, C. H., have bought the garage business of S. R. Benton, in Cairo, Neb.

D. C. Hasse, of Sioux Falls, Ia., is to remove to Newell, the same state, and open a repair shop.

Henry Senz has let the contract for the erection of a concrete garage, 40x60 feet, in Terry, Mont.

William M. Gale has prepared plans for a garage to be erected at 14 Brigham Park, Fitchburg, Mass.

Halloway & Murry is the style of a new firm which is about to enter the garage field in Blue Earth, Minn.

C. O. Kittleson, in Forest City, Ia., has built a garage and will also sell cars; he has the Buick agency.

Franks & Merchants have purchased a skating rink in Canby, Minn., and will remodel it into a garage.

Linwood Giacomini, of Eureka, Cal., has leased quarters and is about to open a repair shop in Federal, Cal.

An electric garage has been opened in Topeka, Kan., by J. H. Taylor, E. W. Davis and G. T. Nininger.

Edward P. Swan, South Deerfield, Mass., has purchased of William Goss the latter's laundry and garage business.

The Marquette Co. is about to establish a factory branch in Kansas City; it will be located at 1416 Grand avenue.

H. Tellander and Emil Nelson, in Worthington, Minn., are about to build a garage; it will be a one-story brick structure 126x54 feet.

Dr. J. C. Simpkins and H. A. Yotter have embarked in the automobile business in Glasgow, Mont.; they have the Ford agency.

Fred and Gilbert Brewer are about to begin in business in Canaan, Conn.; they will operate what will be known as the Brewer Bros. Garage.

Homer H. Judd and James H. Davis are having plans prepared for a garage in Bristol, Conn.; it will be one story, of brick, and 10x80 feet.

Under the style, Winters Garage, J. W. Wainwright, of Winters, Cal., and T. H. Brook, of Esparto, Cal., are to begin business in Esparto.

H. J. Massman has opened a storage garage at 101 South Champion street, Youngstown, Ohio. He has accommodations for seventy-five cars.

T. F. Santry is having a garage built in Tompkinsville, N. Y., at Hannah and Bay streets. It will be one story, 88x81 feet, and will cost $6,000.

Moses Solmson, Baltimore, Md., has been granted permission to build a garage, 38 x 105 feet, on Whitelock street near Carlow avenue. It will cost $4,000.

The Capital Motor Car Co. has been organized in Raleigh, N. C., with R. D. Godwin as president and C. L. Payne manager. R-C-H cars will be handled.

George Allen and J. L. Baugher, as the Staunton Motor Co., have opened a garage in Staunton, Va. They have the agency for Chalmers and Regal cars.

A. G. Arnold and W. E. Ford are preparing to erect a garage at St. Louis and Thompson avenues, Excelsior Springs, Mo. The estimated cost is $25,000.

B. B. Sisson, Wareham, Mass., is preparing to engage in the garage business. His building will be 80 x 45 feet and of concrete and corrugated iron.

Edward L. Quench is having a three-story brick garage built at Waverly and Mole streets, Philadelphia, Pa. It is to be 31 x 50 feet and will cost $12,000.

S. B. Hawley, formerly owner of a half interest in the Everitt agency at Fifth and Ash streets, San Diego, Cal., has bought out his partner, A. H. Culbertson.

D. Field, of Watts, Cal., has purchased Judge Howard's garage on South Los Angeles street, Anaheim, Cal., and will take on supplies and do vulcanizing work.

E. F. McGrafth is about to build a garage on Superior avenue N. E., near East Twelfth street, Cleveland, O. The lease on the real estate is for 99 years.

William Bechman has accepted plans for a garage to be built on Conestoga street, south of Thompson street, Philadelphia, Pa. It will be 105 x 21 feet.

Hutchinson & Wolf, garage proprietors and second-hand car dealers in Greenfield, Ia., have sold out to John Connelly, John Chambers and George D. Musmaker.

MacDonald Purcell and George Seeley have bought the Midway (Cal.) Garage of J. A. Ellis; they will at once build an addition and install additional machinery.

Bishop & Ports, Inc., horse liverymen in Pittsburgh, Pa., are remodeling their three-story establishment into a garage. They will handle a line of electric cars.

E. S. Jennings is making ready to open a vulcanizing business in Raleigh, N. C., at 417-419 South Fayetteville street. He will operate as the Auto Tire Repair Shop.

Denis White, Ford dealer in Newark, Ohio, has been succeeded by the Ford Sales Co., formed by A.P. Hess and J. T. Priest. It is located at 3, 5 and 7 South Fifth street.

L. C. Lieber and George R. Coryell, of Pasadena, Tex., have formed a partnership under the style Lieber-Coryell Co., and will operate a garage at 43-45 East Union street.

G. A. LaValley, of Santa Rosa, Cal., is building a garage in Caliente Springs. He will run an automobile transportation service between the Springs and nearby towns.

J. F. Todd and W. W. Davis, of Webb City, Mo., have formed the Todd-Davis Motor Car Agency; they will handle Paige-Detroit cars in Jasper and Newton counties.

F. O. Arnold, formerly of McMinnville, Tenn., has purchased the Centex Motor Co.'s business, in Waco, Tex.; he will continue it under the style Austin Avenue Garage.

Harry Davis & Sons Co., Reading, Pa., machine shop operators, are altering the front of their establishment on South Ninth street, preparatory to entering the garage business.

The Tire Core Co. of America, which markets the Dahl tire filler, has opened offices in the Ehret Building, Columbus Circle, New York City. R. V. Stewart is manager.

Charles Henry Burman, of Cleveland, O., will remove shortly to Victoria, B. C., where he will engage in the automobile business. He will handle the Hudson and Peerless.

Authority has been granted Dr. Gallanought, of Toronto, Ont., for the erection of a three-story brick garage on Brunswick avenue, near Bloor street. It will cost $25,000.

John F. Airesman, Somerset, Pa., has sold a half interest in his business to Otis W. Dietz, manager of the Somerset Telephone Co. The agency handles Flanders and E-M-F. cars.

W. A. Gabeler and Levi Woodbury, Lawrence, Mass., have secured from the building authorities permisison to construct a concrete garage on Cornish street. The cost will be $4,000.

Douglas Auto Co. is the style selected for a garage business about to be inaugurated in Douglas, Neb., by J. S. Peckham, W. W.

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Smith and James Brownlee. The garage will be 50 x 24 feet.

Samuel Davies has placed contracts for the erection of a one-story garage and repair shop, 40 x 50 feet, in Reading, Pa.; it will be located on Ninth street between Bingaman and Spruce streets.

O. L. Crumbliss, formerly of Surprise, Neb., has purchased the O Street Garage, in Lincoln, Neb., from Arthur Soss. He will sell Cutting and Maxwell cars and operate a day and night automobile livery service.

The Marquette Co., of Detroit, Mich., has established distributing headquarters for the Southwest in Kansas City, Mo., at 1416 Grand avenue. W. P. Morris, formerly with the Mitchell line in that locality is manager.

Electric Vehicle Maintenance Co. is the style of a concern just formed in Oakland, Cal., with Richard Scraba as manager. Quarters have been leased from the Broadway Garage, and an electric garage will be conducted.

The Swinehart Tire & Rubber Co., of Akron, Ohio, has purchased the business of the Long Rubber Co., 1813 Grand avenue, Kansas City, Mo., and will conduct it as a Swinehart branch; C. O. Dall will be manager.

From mining expert work, G. Knutzen has turned to the automobile accessory field, and, among other things, has taken the Minneapolis (Minn.) agency for J. M. shock absorbers. He is located at 98 Eleventh street.

H. D. Stebbs, an automobile dealer in Chattanooga, Tenn., filed a petition in bankruptcy last week. Liabilities are $1,495.75. Assets, listed at $3,000, consist of outstanding accounts of $500 and two automobiles worth $2,500, against which deeds of trust are held by creditors.

Alvan T. Fuller, who has had the Packard agency in Boston, Mass., for many years, hereafter will do business as the Packard Motor Car Co., of Boston. He has registered that title under the laws of the state, which, however, does not mean that Fuller has incorporated his business or admitted any one to partnership. In Fuller's language, the registration merely expresses his belief that "the company name has commercial advantages over that of the individual."

Carl G. Fisher, president of the Indianapolis Motor Speedway, and head of the Prest-O-Lite organization, has reentered the retail automobile field, in which he first laid the foundation of his present large fortune. He has taken the Indianapolis agency for the Packard car and will operate under the style Carl G. Fisher & Co. The business will be established in his new building, at Vermont street and Capitol avenue, which, when completed, will be one of the finest automobile sales and service structures in the West. In addition to housing Fisher & Co., it will also be the headquarters of the Prest-O-Lite Co.

RUSHMORE DECREE IS MODIFIED

Court of Appeals Limits Accounting in Solar Case—Refuses to Further Extend Doctrine of Unfair Competition.

Upholding the doctrine that the manufacturer who evolves a distinctive design of a particular article is entitled to its exclusive use, even though it be unpatented, the United States Court of Appeals for the Second Circuit last week affirmed the decision of the lower court in the case of Samuel W. Rushmore, of Plainfield, against the Badger Brass Mfg. Co., of New York, but in doing so Judges Coxe, Ward and Noyes, who constituted the court, ordered that the decree of the court below be modified, expressing the opinion that the great majority of the defendant's Solar lamps were sold on their own merits and the established reputation of their makers without any reference to the Rushmore production.

Lacking proof of fraud, the court, therefore, refused to award Rushmore the entire profits made on the sales of the defendant's lamps and held that the accounting which he sought should be limited to sales where it is shown that he would have sold his lamps, but for the sale made by the defendant. As a matter of fact, the Badger company had ceased the manufacture of the lamp in question long before the hearing in the lower court occurred, but it carried the case to the Court of Appeals because of the principle involved.

The case was one of several which Rushmore had instituted against other lamp makers, each of which was decided in his favor. They attracted attention because it was one of the few instances which had occurred in the automobile trade in which the design of an unpatented article had been upheld. The court's decision in the Badger case is as follows:

"We have examined the record with care to ascertain if there is any testimony which distinguishes this case from Rushmore v. Manhattan Screw and Stamping Works, 163 Fed. Rep. 939 and Rushmore v. Saxon, 170 Fed. Rep. 1021.

"In the Manhattan case the Circuit Court found 'that the shape, appearance, external attachments and general dress of the Rushmore lamp are not functional and are not elements of mechanical construction essential to the successful practical operation of the lamp as a lamp.' We agreed with this finding and, because of it, affirmed the order, stating, however, that the conclusion carried the doctrine of unfair competition to its utmost limit. We think the doctrine should not be further extended, but there is no occasion for extending it so far as the case at bar is concerned. In all essential particulars the facts are the same.

"Slight differences exist between the defendant's lamps and those of the complainant, but these differences are unimportant and are no more pronounced than in the cases above referred to. . . . . An expert and probably a great majority of automobile purchasers could not be deceived into taking the defendant's lamp, in evidence, for the Rushmore lamp, but the ignorant or careless purchaser looking to general effect and not to what seems to him to be inconsequential details would, very likely, be misled. Such simulations place in the hands of dishonest dealers and agents the materials for misleading and cheating the public. It is unnecessary to dwell on these considerations, as they have been stated many times by this court and need not be repeated. When it appears that a competitor has unnecessarily and knowingly imitated his rival's goods in non-functional features, a court of equity is justified in interfering. Further than this, we do not intend to extend the doctrine.

"The defendant asks that it be relieved from an accounting, or, at least, that the accounting be limited to the damages actually sustained and proved by the complainant. We are inclined to think that the latter request is reasonable and should be granted.

"The defendant's brief states that it appeared at the hearing in the Circuit Court that the defendant 'had long ago ceased making or selling any of the type of lamps in issue.'

"The testimony that the defendant, or its agents, attempted to palm off its lamps as Rushmore lamps is unsatisfactory and unconvincing.

"We are also convinced that the great majority of the defendant's lamps were sold on their merits and on the established reputation of the defendant, without any reference to the complainant's lamps. To award the entire profits made on the sales of defendant's lamps without proof of actual fraud on its part would be inequitable. An accounting covering the entire field of the defendant's sales would involve both parties in a long and expensive examination unwarranted by the probable results. It seems to us unfair that the complainant should recover profits on the sale of lamps by the defendant to persons who never heard of Rushmore and were well aware that the lamps they bought were made by the defendant, and who bought them because they were so made. A decree for profits and damages does not necessarily follow a decree for an injunction. . . We think the accounting should be limited to sales where it is shown by direct or presumptive evidence that the complainant would have sold the lamps but for the sale of the defendant. As so modified the decree should be affirmed with costs."

American Car Importers Incorporate.

The American Car Importing Co., Ltd., of London, has been incorporated under English laws with a capital of $500. The names of the men interested in the enterprise are not made public.

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"AUTO" AND OTHER AMAZING AMERICANISMS.

Gently twitted by the Motor World for their use of terms which appear distorted to American eyes and sound queerly to American ears, several of the British automobile publications have retorted in kind and point out Americanisms which sound as queerly and look as oddly to those who have to do with automobiles on the other side of the pond.

The eccentricity to which they point with most derision is the corruption of the word automobile into "auto," and, though the use of it is not general, it is so commonly employed even by those in the trade, and by "auto editors" and others who write for public prints, that the derision is well merited. The English publications repeat what the Motor World itself has said on more than one occasion, i. e., that as the abbreviation "auto" means "self," its use as a definition of "automobile" is senseless and without justification of any sort.

Abroad they are given to the use of the word "motor," as an abbreviated description of motor vehicles; and, while they admit it is only a compromise, the Britishers rightly contend, as the dictionary defines "motor" as "that which gives motion—a movement," its use is far more appropriate than the bastard term "auto," which term, as so frequently is the case, is carried further and "automobilists" corrupted into "autoists" and "automobiling" into "autoing," which smell at least half way to heaven.

The Motor World is no purist but the designation "auto" and its ensuing corruptions are so obviously improper and misapplied that it seems a great pity that one or the other of the national trade organizations does not take action of the sort that would discourage their use. The employment of the word "game" as a definition of "business" has been quite generally eliminated, due to more or less concerted action, and it is within the realm of probability that the term "auto" also can be effaced by the same methods.

"BOOMING" OF THE GASOLENE TANK.

It might be to the advantage of some manufacturers to observe, or rather to come within earshot of the small boy with his election-time "snapper." The "snapper," so-called by reason of the exceedingly sharp snaps it emits under the application of nimble fingers, is an instrument of torture which is used also by elevator starters in tall buildings to signal the West Indian operators when to put their cars in motion. The instrument itself is formed of a small piece of spring steel so mounted in a holder that when the free end is depressed the center buckles up and snaps.

The analogy between the "snapper" and the automobile is this: Nearly every rectangular gasolene tank is an embryo "snapper." Being formed of sheet steel (very few are made of copper, which mitigates the trouble) any or all of the sides of the tank become as the tongue of the small boy's "snapper," only the tongue is much larger and the tone of the snap becomes proportionately deeper; its deepness is increased by the shape of the tank, which serves also as a sounding board, and it becomes in fact a deep-toned boom. The condition is most noticeable, of course, where the tank is located in the dash, which location steadily is increasing in popularity, and is augmented when the fuel is fed under pressure by the expansion and contraction of the air in the tank. When the pressure in the tank reaches a certain point there may be a continual booming, which is set up by vibration.

It is a simple matter to eliminate the trouble, and merely requires that "splash plates" soldered to the inner sides of the tank be fitted. These would effectually eliminate the possibility of the sides moving and at the same time would operate to reduce the strain on the tank caused by the heavy body of fuel splashing from end to end or side to side under the effect of body movement.

CONNECTING RODS AS GOOD EXAMPLES.

The way in which the various engine parts have been brought from their original crudity to a state of comparative perfection, perhaps is as well illustrated by the connecting rod as any other one part. Originally this invisible but essential member was made in almost as many shapes as there were makers; now it is made in a few types which, though differing slightly in outward form, embody the same fundamental principles. Originally made by old-fashioned and painfully slow machine shop methods, they now are made in huge quantities, thousands exactly alike, and each one infinitely better than any of their ancient prototypes, on which perhaps twenty times as much time and labor were lavished. And whereas the best and most expensive material available in the olden days was not to be relied upon to stand the strain, in these days the material commonly used is amply strong, with a wide margin of safety, and notwithstanding its low cost is immeasurably superior to anything of the kind that was available in the days when the gasolene motor first began to attract serious attention as an economical generator of power.

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TO REDUCE THE ABUSE OF TRUCKS

New York Conference Results in Drastic Recommendation Affecting Guarantees —N. A. A. M. and S. A. E. Agree.

Drastic measures for the suppression of the overloading and overspeeding of motor trucks were recommended, a report indicating that the past year's sales of commercial vehicles exceeded by 75 per cent. the sales of all previous years was read, and arrangements to prevent duplication or conflict of work between the National Association of Automobile Manufacturers and the Society of Automobile Engineers, were the "high points" of the second meeting of the commercial motor vehicle manufacturers held under the auspices of the N. A. A. M., in New York on Tuesday last, June 4th. Other matters that received attention were the standard warranty, which underwent some changes which apparently were desired by a number of the members; insurance rates on motor trucks; frame and platform heights; and tire mileage under different conditions of road surface and topography. The conclusions reached took the form of recommendations which were laid before the meeting of the N. A. A. M., held the following day, for ratification.

It is proposed to check truck abuse by causing the maker's guarantee to become void if the machine is improperly treated, and, with this end in view, to attach to each machine, in a conspicuous place, such as the back of the driver's seat facing the loading platform, a caution plate giving the rated speed, chassis weight, standard body weight allowance, load capacity exclusive of body weight allowance, total weight of vehicle, body and load, weight of body fitted and weight of load with such body.

Statistics relative to sales of commercial motor vehicles, as compiled from figures supplied by about 80 manufacturers of gasolene cars, indicate that up to the end of 1911 the total sales amounted to more than 18,000 vehicles, having a total value of $35,000,000, in round numbers. Of this number three-fifths were produced during the year 1911. The figures given are regarded as incomplete, however, as there are said to be some 275 manufacturers in the commercial vehicle field; and while many of these are of such recent origin as to scarcely figure in the result, on the other hand, it was reported, there are at least 65 manufacturers who have been making commercial vehicles for at least a year, but who have not reported the number turned out by their factories. The real totals, therefore, are somewhat in excess of the figures reported. The figures given by such manufacturers as have reported are held as confidential, for the use of companies that have assisted in the work by giving their own figures.

As a result of the conference between the commercial vehicle committee of the N. A. A. M. and a committee of the S. A. E. headed by President H. F. Donaldson, it was decided that the manufacturers' association would confine its standardization work to features particularly affecting the sale and use of trucks, such as general dimensions and the like, while the prevailing practice in structural details will be investigated and reported on by the S. A. E.

A discussion of motor truck insurance rates revealed the fact that the subject was considered of sufficient importance to warrant a careful investigation, and it was turned over to J. S. Marvin, general manager of the N. A. A. M. for attention. Reports were made in the matter of investigations, still incomplete, as to the feasibility of establishing standard frame and loading platform heights, and also as to actual tire mileage under various conditions and the proportionate weight of useful load to chassis weight. The next meeting will be held November 7th.

In attendance were the following: S. D. Waldon, chairman, Packard Motor Car Co.; Albert F. Mais, Studebaker Corporation; Edward R. Hewitt, International Motor Co.; C. A. Neracher, Gramm Motor Truck Co.; F. R. White, Baker Motor Vehicle Co.; F. I. Harding, Peerless Motor Car Co.; A. M. Chase, Chase Motor Truck Co.; E. W. Curtis, Jr., General Vehicle Co.; Arthur W. Robinson, Locomobile Co. of America; C. P. Morton, Packard Motor Car Co.; O. S. Goan, Alden Sampson Mfg. Co.; Walter C. White, The White Co.; C. H. McCausland, Kissel Motor Car Co.; M. T. Pulcher, Federal Motor Truck Co.; Harold L. Pope, The Pope Mfg. Co.; H. Kerr Thomas, Pierce-Arrow Motor Car Co.; Morris R. Machel, Hydraulic Truck Sales Co.; J. S. Marvin, N. A. A. M.; Alfred Reeves, U. S. Motor Co.

April Imports Show Falling Off.

Imports of automobiles into the United States for the month of April, 1912, show a decrease of three in number and $8,077 in value as compared with April of the preceding year, the total of cars imported during the month being 59 and their value $133,856, as compared with 62 valued at $141,933 during the same month of 1911. This is a loss of nearly 5 per cent. in number and slightly less than 6 per cent. in valuation. Quantities and values of imports were:

	April, 1911		April, 1912	
Imported from	No.	Value.	No.	Value.
United Kingdom	11	$28,988	10	$23,817
France	22	52,289	34	74,489
Germany	3	9,166	8	20,075
Italy	6	10,072	3	7,579
Other countries.....	20	41,418	4	7,896
Total cars	62	$141,933	59	$133,856
Parts of		47,454		22,031
Total cars and parts		$189,387		$155,887

The figures for the ten months ending April, 1912, show that 845 cars valued at $1,867,495 were imported, as compared with 696 cars with a valuation of $1,484,283 for the ten months ending with April, 1911, a gain of 20 per cent. in number and 25 per cent. in valuation. The valuation of parts imported for ten months ending with April, 1912, was $262,243, and with April, 1911, $288,322, a falling off of between 9 and 10 per cent.

Goodrich-Diamond Deal is Ratified.

As was expected, the stockholders of both companies have approved the purchase by the B. F. Goodrich Co. of the Diamond Rubber Co., the meeting of the Diamond stockholders having occurred on May 27th, and that of the Goodrich company on June 3rd. The B. F. Goodrich Co. also has filed its certificate with the New York authorities increasing its capital from $45,000,000 to $90,000,000, the added $45,000,000 representing the stock issued for the Diamond property, which had been capitalized at $10,000,000.



June 6-7, Chicago, Ill.—Inter-Club reliability run under the auspices of the Chicago Motor Club and the Illinois Athletic Club.

June 8, Salem, N. H.—Rockingham Park track races.

June 8, Narberth, Pa.—Track races under the auspices of Quaker City Motor Club.

June 8, Elm Ridge, Mo.—Track races under the auspices of the Automobile Club of Kansas City.

June 11-13, Washington, D. C.—Automobile Club of Washington's second annual reliability tour for pleasure cars.

June 15, Cincinnati, Ohio—Cincinnati Automobile Dealers' Association's annual hill climb on Stanley avenue hill.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

June 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 23-29, Laurel, Md.—Track races promoted by R. E. Shadel.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-5, Taylor, Tex.—Track races under the auspices of the Taylor Automobile Club.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

July 5-6, Tacoma, Wash.—Road races under the auspices of the Montamars Festo Automobile Commission.

July 15, Milwaukee, Wis.—Reliability tour under the auspices of the Wisconsin State Automobile Association.

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NO ARBITRATION FOR BONIFIELD

He's "in" and Will Take No Chance of Being Ousted—A. A. A. Hears Ohio "Warriors" but Defers Action.

Ohio's "civil war" was transferred to New York early this week, when the semi-annual meeting of the National Assembly of the American Automobile Association convened in Hotel Astor on Tuesday, 4th inst. Both of Ohio's warring factions were represented and both were loaded to the nozzle.

Since the trouble was precipitated at the annual meeting of the Ohio State Automobile Association, in Kenton, on May 18, when the delegates from 14 clubs left the meeting because of the alleged illegal and arbitrary rulings of Dr. C. L. Bonifield, president of the association, the bolting delegates had effected an organization under the title Ohio State Automobile Federation. It was organized in Cleveland on Saturday last, 1st inst., with C. C. Jaynes, of Columbus, as president; F. C. Caley, Cleveland, secretary, and M. L. Lawrence, of Cleveland, treasurer. They came to the New York meeting and asked to be recognized as the ruling power in Ohio, representing themselves as the real friends and bona fide supporters of the A. A. A., which is quite generally admitted to be the case.

Dr. Bonifield also was present, however, accompanied by a battery of vocal artillery, and he fought the Federation's plea for recognition at every point. He made the most of the fact that the Ohio State Automobile Association is already the recognized representative of the A. A. A. in that state, and though the suggestion actually was made that the A. A. A. laws be amended to permit of the recognition of both state bodies, it was recognized that a dangerous precedent would be established and the force of Bonifield's intrenched position was admitted. The fight waxed warm and interesting for several hours, and for a brief moment it appeared that peace might be obtained through the medium of arbitration. Louis R. Speare, former president of the A. A. A., offered the suggestion, which readily was accepted by the Federation delegates. Bonifield, however, resolutely declared that he had been elected president of the state association and that he proposed to hold the office at all hazards. He proclaimed that he would not submit to arbitration of any sort, and that if any efforts were made to dislodge him he would take the matter into the courts.

Bonifield's attitude did not serve to make friends for him. Before the "war" in Ohio broke out, and although he was—and is—one of the vice-presidents of the national organization, he had been unusually pointed in his criticisms of the A. A. A. and so free in his denouncement of certain of its officials that it has become known that President Hooper, of the A. A. A., suggested that his conduct was unbecoming an officer and that, therefore, his resignation would be welcomed. The Cincinnati doctor, however, does not seem to care what happens, so long as he holds his office, and he not only did not accept the invitation to resign, but instead laid his plans so well that he was re-elected president of the state association at the memorable meeting in Kenton last month, his election being brought about, it is alleged, by the votes of six "mushroom" clubs which were permitted to vote on their own eligibility, which had been questioned, which ruling on Bonifield's part brought about the split in the state organization.

When arbitration was rejected and after hours of argument, the A. A. A. National Assembly was unable to find a way out of the trouble, and apparently in the hope that time would heal the wound, or find some other solution, action was postponed until the September meeting of the executive committee, which means that Bonifield and his cohorts will remain in power until then.

All other proceedings at Tuesday's meetings sank into insignificance by comparison with the fight between the Ohio warriors. The most important subject considered has to do with the action of many states in which registration fees are being greatly increased in taxing automobiles on a personal property basis also. The matter was involved in a test case which was decided adversely to motorists by the New Jersey state courts, and at the A. A. A. meeting it was urged that as such systems of double taxation are both improper and repugnant, the organization should carry the test case in question to the United States Supreme Court. The suggestion was referred to a special committee consisting of President Hooper and ex-President Hotchkiss.

In preparation for the next A. A. A. national reliability tour, from Detroit to New Orleans, Dr. C. E. Dutton, of Minnesota, was, upon recommendation of the president, approved as chairman of the special committee in charge, which includes L. R. Speare, Massachusetts; W. E. Moyer, Iowa; John Wilson, Pennsylvania, and W. E. Metzger, Michigan.

Not the least satisfactory feature of the meeting on Tuesday was the addition to the A. A. A. membership roll of 43 clubs.

Kansas reported 11 clubs, Nebraska 12, Iowa 7, Ohio 9, and Pennsylvania, Oklahoma, Idaho and Montana 1 each. Forty-two state bodies and some 400 clubs are now included in the A. A. A. total.

Hill Climb and Racemeet Abandoned.

Lack of interest, which is to say a lack of entries, was the reason why two of the "events" which were to have been run off Memorial Day are not included in the list of past performances. Danbury, Conn., which was to have witnessed a hill climb, was disappointed, while the track races which were to have been run on the track at Bridgton, N. J., by the South Jersey Motor Club also fell through.

OCEAN PARKWAY OPENED AT LAST

New York's Mayor, Who Once Called Motorists "Hogs," Unexpectedly Lifts the Ban—Horsemen Lose Monopoly.

No longer does a corporal's guard of horse-trotters own or usurp Ocean Parkway, which is the gateway to Coney Island. After the automobile interests had unavailably tried persuasion, peaceful and otherwise, after a test case had been instituted and had been lost, after they had appealed to Mayor Gaynor, only to be more or less politely informed that they were "hogs" for desiring to interfere with the "fun" of the horse-trotters, Ocean Parkway, which is as frequently styled Coney Island Boulevard, was unexpectedly thrown open to traffic of all sorts on Monday last, 3rd inst.

The horsemen have owned the boulevard for many years, and their privilege was so firmly intrenched, at least in political circles, that absolutely nothing served to dislodge them. The boulevard itself, a great, wide thoroughfare, is about five miles in length, and many years ago political influence caused a mid-section of about a mile and a half to be turned over to owners of fast nags, whose numbers had sadly dwindled. In order to reach Coney Island, or to reach Brooklyn or New York on the return journey, it was necessary for automobiles to use a parallel road which was so narrow that there was little more than room for two cars to pass. Many accidents happened, but the authorities failed to heed them, and until last week, when, acting on the suggestion of Police Commissioner Waldo, Mayor Gaynor, after consulting with the Park Commissioner of Brooklyn, issued the order that ended the horse trotters' exclusive privilege.

It was only about two years ago that the Park Commissioner himself, by whose order the boulevard had been restricted, had a law passed by the Legislature upholding his hands, and it was when the public hearing on the bill occurred that Mayor Gaynor delivered his polite intimation that automobilists were "hogs."

Massachusetts Racemeet Twice Postponed.

Severe and enduring storms, which played havoc with the surface of the track, necessitated the disappointment of several thousand spectators who had turned out to witness the Rockingham Park track events at Salem, Mass., which were to have been contested on Memorial Day. Two days later, Saturday, June 1st, the condition of the track was very little, if any, better, and certainly not so near the "pink of perfection" state as to be conducive to fast automobile driving, so that the running of the events was again postponed. Weather permitting, the Salemites, according to the latest reports, will hold their speed events on Saturday next, 8th inst.

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MIXED MEET AT NATIONAL CAPITAL

Automobiles and Motorcycles Race on Bennings Track—Cleveland Campbell Takes 20-Mile Event.

As usually is the case, the free-for-all event, which went for 20 miles, was "the" event of the day on Thursday last, May 30th, when the National Capital Motorcycle Club staged a mixed motorcycle and automobile race meet on the Bennings track. The winner of the event, who also was the only driver of a field of five to finish, was Cleveland Campbell, who drove his Cole car twenty times around the one mile track in 28:51⅗, averaging 41.58 miles an hour.

The two Class E ten-mile events, for machines with piston displacements of under 230 and 600 cubic inches, respectively, which completed the automobile portion of the program, were won by R. L. Miller in an Everitt, time 15:30, and Irving C. Barber, who piloted a Warren, the same machine which Jack Towers drove when he established straightaway records for five and ten mile distances in the 231-300 inch class at Jacksonville last year, and won in 15:05. Miller's average time was low—38.6 miles an hour—while the time made by Barber, 39.7 miles an hour, was but slightly better.

Although the situation, construction and contour of the Bennings track are sometimes called ideal for automobile racing, the condition of the surface was such that real bursts of speed were well nigh impossible. The oil which had been applied to act as a binder and to lay the dust lay on the soft, sandy surface in puddles, and the dirt was so soft in spots that driving and steering were rendered difficult, even at the slow speeds which prevailed.

Entries in all of the events were few and far between, but finishers, to use a phrase more expressive than pleasant sounding, were almost "as scarce as hen's teeth," considerable mechanical difficulty, and not a slight amount of tire trouble causing many retirements. Twice the Ford machine drew up short with frozen pistons, and ignition trouble caused the withdrawal from the free-for-all event of W. H. Kessler and I. C. Barber, both behind the wheels of Warren machines. Campbell's Cole retired after completing three laps of the 600-inch event when a broken first speed pinion jammed in the gear case, but the machine, which was hastily repaired, won the free-for-all after a poor get-away occasioned by a forced start on the second speed. The Independence machine, which was to have been piloted by Roy De Neale, twice was disqualified—once for lining up for the start without a hood, and a second time for circling the track in the wrong direction just previous to the start of the free-for-all event. The summary:

Ten miles, Class E, open to cars in Class C under 230 inches displacement—Won by R. L. Miller (Everitt); second, Frank G. Stewart, (Reo); W. L. Frazier (Ford), out second lap; Wm. H. Kessler (Warren) out third lap. Time 15:30.

Ten miles, Class E, open to cars in Class E under 600 inches displacement—Won by Irving C. Barber (Warren); second, W. H. Kessler (Warren); C. C. Campbell (Cole) out third lap. Time 15:05.

Twenty miles, free-for-all—Won by C. C. Campbell (Cole); W. H. Kessler (Warren) out eighteenth lap; I. C. Barber (Warren) out sixteenth lap; F. G. Stewart (Reo) out twelfth lap; H. G. Machen (Ford) out third lap. Time 28:51⅗.

Milwaukee Applies for Both Sanctions.

Apparently the Milwaukee Automobile Dealers' Association has been unable to get anyone to take the Grand Prize "elephant" off its hands. At any rate, it has applied for sanction for both the Vanderbilt cup race, which is its first choice, and for the Grand Prize. In its application to the A. A. A. for the Vanderbilt sanction, the Milwaukeeans specify September 17th as the date for the classic race, while in the application for Grand Prize sanction, which is in the hands of the Automobile Club of America, September 24th has been fixed for the date of the running of that event. The governors of the A. C. A. will take action within a week, and until they do so, and the date of the Grand Prize race is definitely fixed, the A. A. A. will hold the Vanderbilt sanction in abeyance. It is firm in its insistence that a sufficient period shall intervene between the two races to assure that the truly American Vanderbilt race shall not be wet-blanketed by the Grand Prize affair, which always has had a more or less foreign flavor. The classics will be run over what is known as the Greenfield course, the necessary permits having been obtained from the authorities having jurisdiction over the course.

Three Races at Three Miles in Scranton.

Things come by "threes" in Scranton (Pa.), or so it would seem from a glance at the order of things which was followed during the mixed motorcycle and automobile races which were run on the Minooka Park track by H. B. Andrews on Memorial day. Not alone were there three motorcycle events and three automobile events, but each of the three events of both classes went for three miles. William Williams, who piloted a Buick machine in the automobile events, drove consistently and landed first place in both Class C events, which he won in 3:52, and the Class D, free-for-all, in which his time was identically the same. Thomas Maher, who drove a Matheson, ran a close second in the free-for-all. The third event, a free-for-all handicap, went to Edward Howell, in a Ford, who finished in 3:55, five seconds ahead of Williams, who was handicapped 45 seconds.

LETTER OF LAW KEY TO VICTORY

Wherein Fletcher Cup Contest Differs from Most Competitions—Harding Proves Best Judge of Pace.

Neither the ability of the machine to operate without adjustment for any given length of time, nor the capability of the driver to guide it over the course in less time than was needed by his competitors, were necessary in order that W. S. Harding, who piloted a Cadillac machine, be declared winner of the contest which was conducted on Saturday last, 1st inst., by the Automobile Club of Philadelphia. All that it was required of Harding to gain a leg on the Fletcher Cup, with considerable accent to the "all," was to drive his machine through each and every township embraced by the 65-mile course which led through four Pennsylvania counties, at speeds nearer legal than were the speeds of the other contenders.

The run, which is an annual affair for members of the club only, and which should, if looked at in the proper light, be called a "speed judgment contest," originated ten years ago, when H. Bartol Brazier offered the Brazier cup to the owner who should three times, not necessarily in succession, take first honors in a cross-country endurance contest. The run for several years was far more of a race than an endurance run, and the Brazier Cup finally was won by G. B. Fletcher, who evidently was "speed king" of the A. C. of P. The following year the winner of the original trophy offered the Fletcher Cup to be contested for, under less strenuous, if as skilful, conditions. Instead of requiring that each contestant break speed laws, they require that he operate his car over the prescribed course at rates closer to those prescribed by the local ordinances than the speeds of his fellows. The machines were timed at secret controls, and the driver penalized a point for each and every minute he was ahead or behind his scheduled time.

Eleven contenders entered the contest, and, needless to say, none finished with a clean score. Harding won, but E. C. B. Fletcher, at the wheel of a Packard machine, ran him a close second, while but two-thirds of a penalty separated the score made by Charles Moller in a Stearns-Knight machine, from Fletcher. The penalties were as follows:

W. S. Harding, Cadillac	12¾
E. C. B. Fletcher, Packard	14⅓
Charles Moller, Stearns-Knight	15
Alan Corson, Buick	20⅓
A. J. King, Columbia	32½
George W. D. Fletcher, Buick	25⅓
P. M. Elsasser, Lozier	26
Henry Fallow, Case	38½
D. W. Harper, Case	92
F. M. Mitchell, Marmon	153
W. D. McCullough, Stutz	Disqualified

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JUST HOW JOE DAWSON GOT RICH QUICKLY

Being the Story of the Spectacular 500-Mile Sweepstakes—De Palma Was Quicker Than Dawson But the Pace Tells and He Falls in Sight of the Goal and Again an Indiana Driver of an Indiana Car Wins on Indiana Soil the Fastest Race Ever Run.

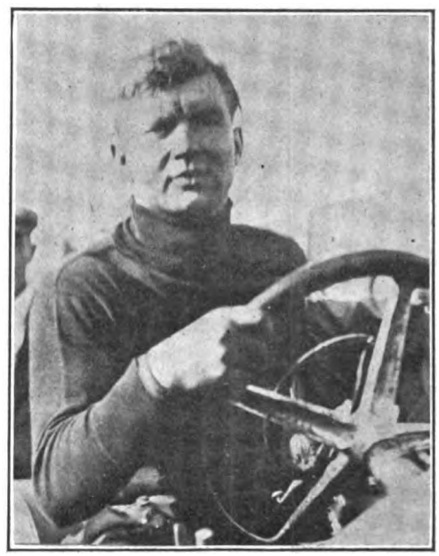
HOW THE 10 PRIZE WINNERS FINISHED AND WHAT HAPPENED TO THE OTHER 14

Driver and Car.	Time.	Cyl.	Bore.	Stroke.	Piston Displ.	Weight.	Gear Ratio.	Wheelbase.	Tires.	Magneto.	Carburetter.
Joe Dawson, National	6:21:06	4	5	6¼	490	2,600	2.10:1	112	Michelin	Splitdorf	Schebler
Teddy Tetzlaff, Fiat	6:31:29	4	127 mm.	190 mm.	589	2,650	2.00:1	114	Miller	Bosch	Fiat
Hughie Hughes, Mercer	6:33:09	4	4⅜	5	300	2,200	2.50:1	108	Michelin	Bosch	Rayfield
Chas. Merz, Stutz	6:34:40	4	4¾	5½	390	2,380	——	108	Michelin	Splitdorf	Schebler
Wm. Endicott, Schacht	6:46:28	4	4¾	5½	390	2,700	2.00:1	110	Michelin	Remy	Rayfield
Len Zengle, Stutz	6:50:28	4	4¾	5½	390	2,380	——	108	Michelin	Splitdorf	Schebler
John Jenkins, White	6:52:38	6	4¼	5¾	489	3,190	2.20:1	114	Michelin	Bosch	White
Joe Horan, Lozier	6:59:38	4	5⅜	6	544	——	2.10:1	124	Michelin	——	——
Howard Wilcox, National	7:11:30	4	4⅞	6	448	2,790	2.30:1	112	Michelin	Splitdorf	Schebler
Ralph Mulford, Knox	8:53:00	6	4.8	5.5	597	3,500	1.95:1	114	Michelin	Bosch	Rayfield
Ralph De Palma, Mercedes		4	131 mm.	180 mm.	583	Out in 497th mile—Broke piston					
Robert Burman, Cutting		4	4 7/32	7	597	Out in 395th mile—Capsized					
Bert Dingley, Simplex		4	5¾	5¾	597	Out in 290th mile—Broke connecting rod					
Joe Matson, Lozier		4	5⅜	6	544	Out in 275th mile—Burned out bearing					
Spencer Wishart, Mercedes		4	131 mm.	180 mm.	583	Out in 207th mile—Broke water connection					
Gil. Anderson, Stutz		4	4¾	5½	390	Out in 200th mile—Rear wheel collapsed					
Wm. Liesaw, Marquette-Buick		4	6	5¼	594	Out in 180th mile—Caught fire					
Louis Disbrow, Case		6	4⅜	5	450	Out in 167th mile—Sheared differential pin					
M. Marquette, McFarlan		6	4¼	5	425	Out in 157th mile—Ripped off both rear wheels					
Harvey Herrick, Case		6	4⅜	5	450	Out in 137th mile—Broke camshaft bearing					
Lee Frayer, Firestone-Columbus		4	5	5½	431	Out in 107th mile—Broke valve					
David Bruce-Brown, National		4	4⅞	6	448	Out in 63d mile—Broke piston					
Len Ormsby, Opel		4	4½	6⅞	450	Out in 18th mile—Broke cylinder					
Harry Knight, Lexington		6	4⅛	5¼	422	Out in 18th mile—Engine trouble					

Everyone who knows how Joe Dawson won the 500-mile Sweepstakes on the Indianapolis Speedway on Thursday last, 30th ult., and knows also what happened to Ralph De Palma, immediately has recalled the old proverb, "The race is not always to the swift." In this case, however, "swift" scarcely is the term that applies; for all of the 24 cars that started in the great race were swift—and uncommonly swift, at that. For the occasion, therefore, the proverb needs must read, "The race is not always to the swiftest."

Although Dawson won, there is no room to doubt that De Palma was swiftest. But more than surpassing swiftness is necessary for a race of the sort. It was the pace that killed De Palma, or, rather, killed the Mercedes car which he drove. Not quite so swift, but swifter than all the others, the National which Dawson guided to victory was made of the stuff which pace could not kill. And the pace it maintained was fast enough and uncanny enough to blur the optics of the average mortal who beheld it. His time, 6:21.06, works out at 78.72 miles an hour, or 47.25 seconds a mile, and therefore totally eclipses any other mark that ever was put up.

And so it was that Joe Dawson, the smiling Indiana lad, 23 years old and almost painfully unassuming, carried away the first prize—the neat sum of $20,000 and several thousands added. The total is estimated at something like $25,000, which surely is higher pay than any opera star or baseball player ever received for barely 6½ hours' work. It was by far the fastest automobile race that ever was run, and in finishing in front young Dawson knocked Ray Harroun's record of 74.6 miles an hour almost a league higher than the proverbial kite; he finished the 500 miles in 21 minutes and 2 seconds less than Harroun with his Marmon required. For that matter, every one of the first four drivers to finish bettered Harroun's time of 6:42.08.

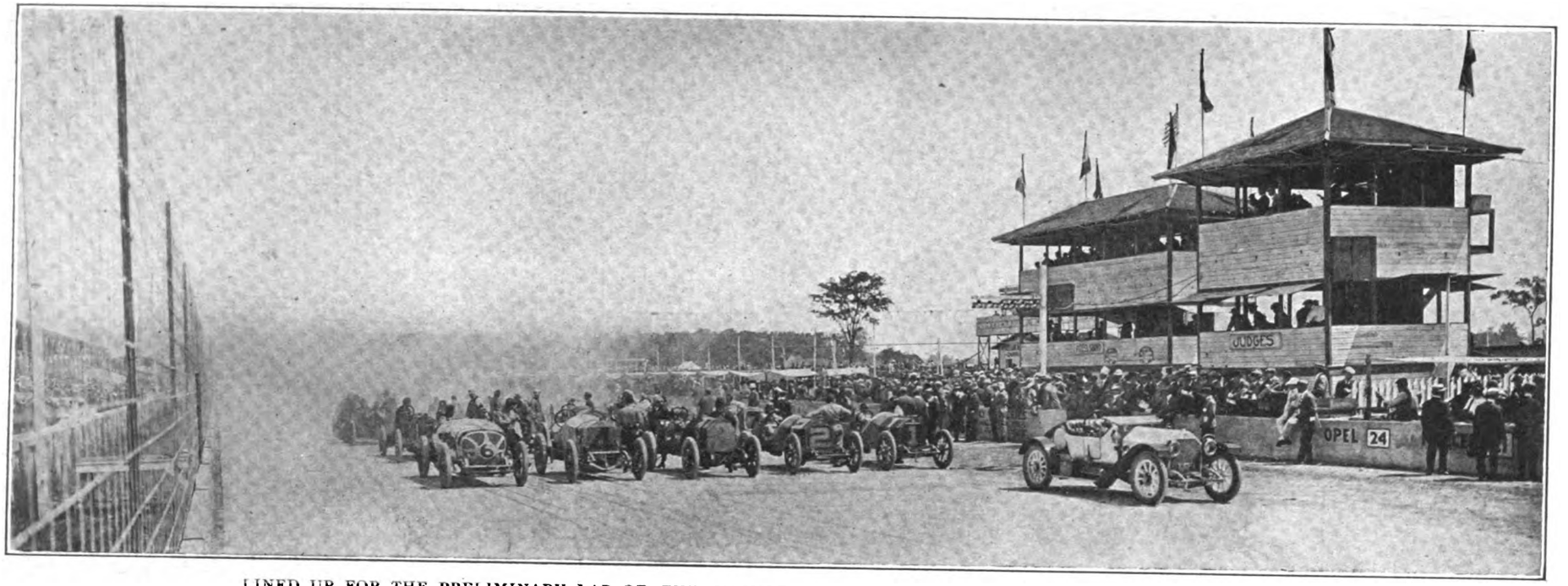


DAWSON'S $20,000 EXPRESSION

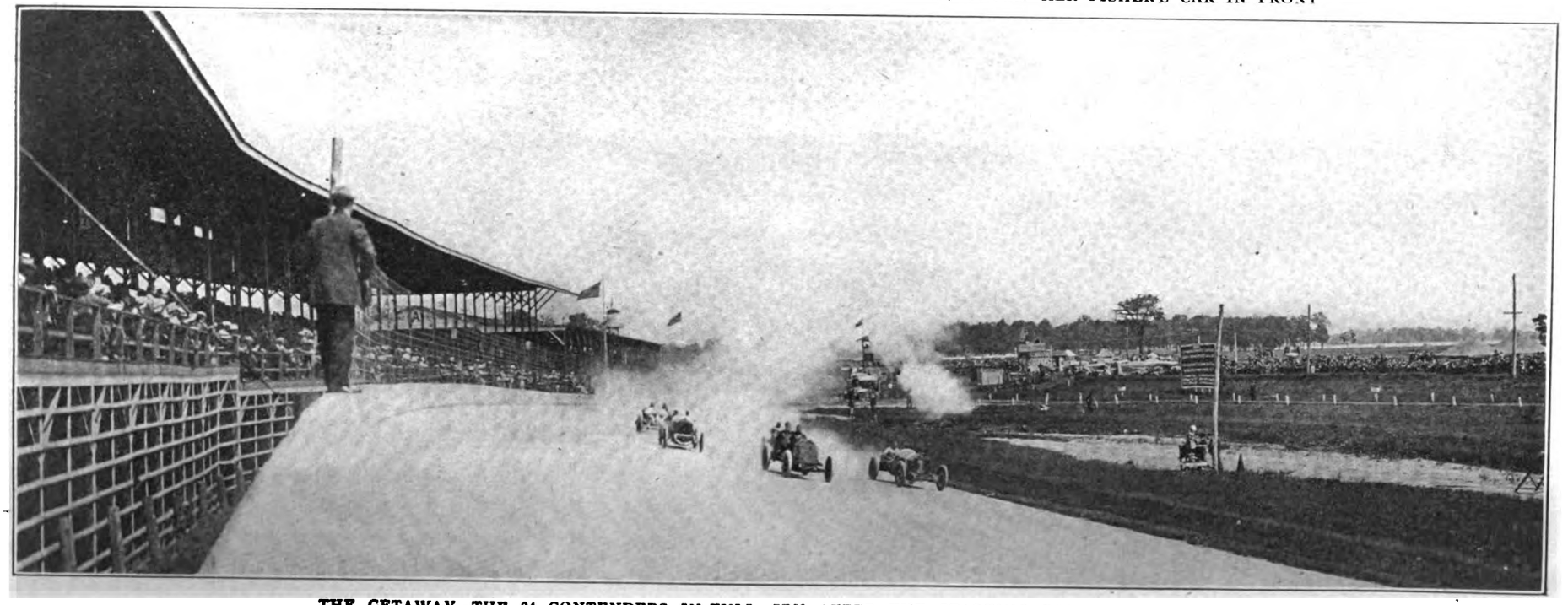
But even though Dawson did win, he was for a long time what one spectator enthusiastically styled "the greatest little runner-up ever." His was the honor of winning and of carrying off the spoils, but up to the 497th mile the glory was all Ralph De Palma's. For 490 miles he consistently smashed every existing record for the intermediate distances; everything up to that distance went by the board; there was not a driver or a car on the track that could hold him when he chose to let his gray Mercedes out. But with the race almost won—with $20,000 almost within the grasp of his fingers—his Nemesis made itself apparent, and victory was snatched from him in a twinkling. He had only three laps to go and was five laps ahead of Dawson when the hard-worked engine in his car laid down with a broken piston, and one of the fairest, best liked and most sportsmanlike drivers that ever held a steering wheel faced defeat with a smile, and remarked to Starter Wagner: "It's just such things that make the game interesting." The groan that the crowd emitted when De Palma quit scarcely could have voiced the disappointment in the plucky driver's heart.

Teddy Tetzlaff, who sprang into fame and fortune on California soil when he made road racing records last year at Santa Monica, was the second man to receive the checkered flag, his big red Fiat pounding over the line in 6:31.29; his average speed was at the rate of 76.62 miles an hour. But probably there was glory enough for others, and most of it belongs to Hughie Hughes, whose name has become practically synonymous for Mercer and victory, for his car was the smallest one in the race; that is,

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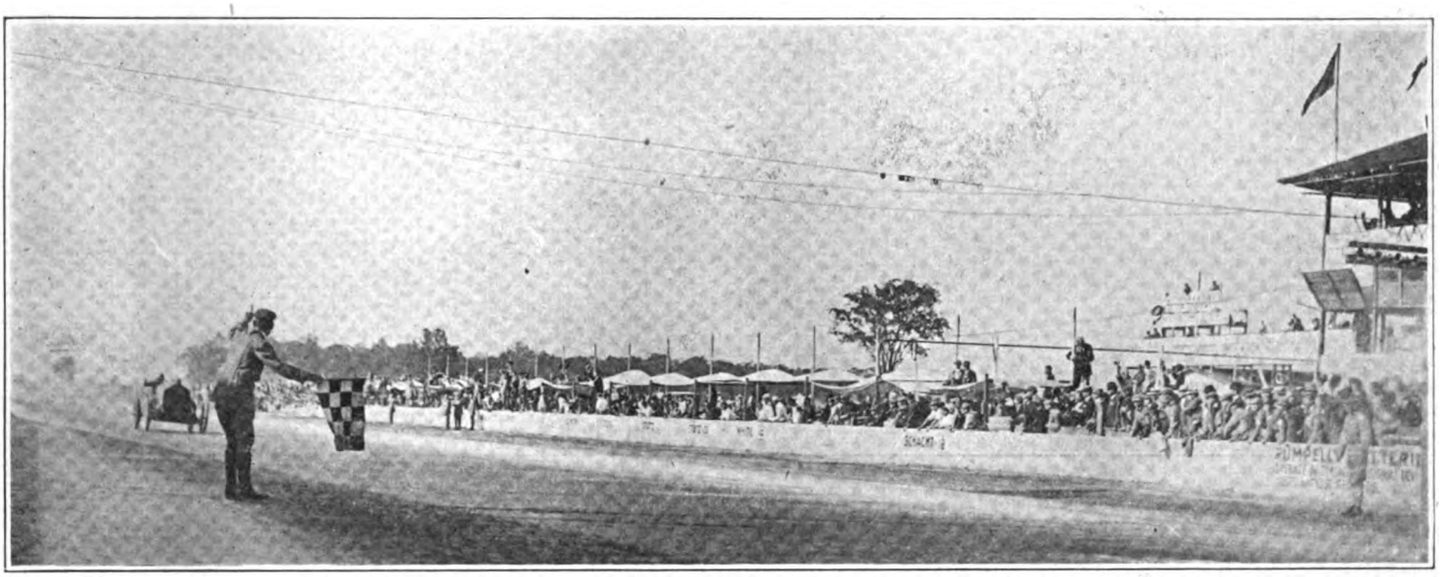


LINED UP FOR THE PRELIMINARY LAP OF THE 500-MILE SWEEPSTAKES; PACEMAKER FISHER'S CAR IN FRONT



THE GETAWAY—THE 24 CONTENDERS IN FULL CRY AFTER THE STARTING BOMB HAD BEEN FIRED

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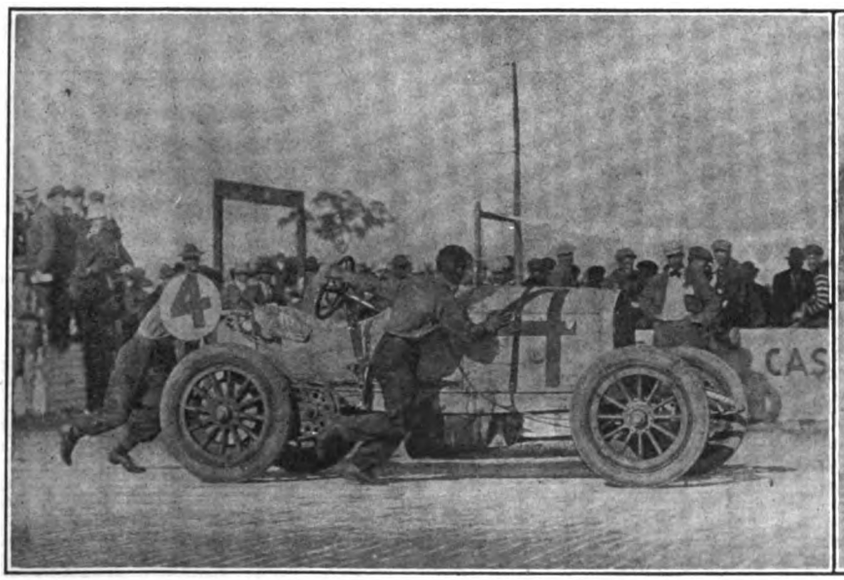
DAWSON RECEIVING THE CHECKERED FLAG WHICH SPELLED VICTORY AND RICHES

it was the smallest if judged merely by piston displacement, though if judged by performance, it was one of the biggest. Hughes drove his yellow, wire-wheeled Mercer over the route at the rate of 76.27 miles an hour, his elapsed time being 6:33.09, which is just 8 minutes 59 seconds better than Harroun did last year with a Marmon with 177 inches greater piston displacement. He beat 21 cars with greater piston displacement than that of his Mercer—many of them had nearly twice the displacement—and once more demonstrated beyond cavil that mere size may signify nothing in a race that calls for stamina and an ability to withstand a terrific pounding as well as for high speed.

Though it now has been definitely settled that Hughes truly won third prize, which amounted to $5,000, Charles Merz, who drove the No. 28 Stutz entry into fourth place in 6:34.40, thought at first that there had been an error in scoring and that he was entitled to this place. In a perfectly friendly spirit he went to Referee Pardington and explained the situation as he saw it, though no protest over the ruling was made. However, re-checking the scores revealed that the first count was correct, and Merz received his $3,000 in content. His average speed was 75.95 miles an hour. The order of the 10 drivers who finished, together with their official times, is given in the accompanying table.

When last year a great throng gathered in the Hoosier capital to witness the first 500-mile race, natives undoubtedly saw the largest crowd ever assembled on Indiana soil within a given area. But if the crowd that gathered on Thursday last can be judged in part by the number of paid admissions to the Speedway — Carl Fisher places the figure at 72,000, which, he says, is fully 5,000 more than last year passed through the gates—and supplemented by the number of persons who stalled the downtown sidewalks and were shoved and jostled about until they spread out onto the roadways, it was even greater.

True to the forecasts of the weather man, published in display type in the Indianapolis papers, the day of the race dawned clear and cloudy, and the odds that Harroun's record would not be broken became shorter as soon as the sporting fraternity could don its street clothes and "open shop." Last year it was hot in Indianapolis on Decoration Day. In fact, it was so very hot that there were few who cared to exert themselves any more than was absolutely necessary. This year the only deterrant to exertions was the density of the crowd, as the air was positively chilly and overcoats, mostly of the rain-excluding variety, were very much in evidence. Incidentally, the coats acted as very good dusters, for, as was the case last year, and despite the fact that a liberal quantity of rain fell the night before, the roads leading to the Speedway, four miles out, were dry. That is, some of

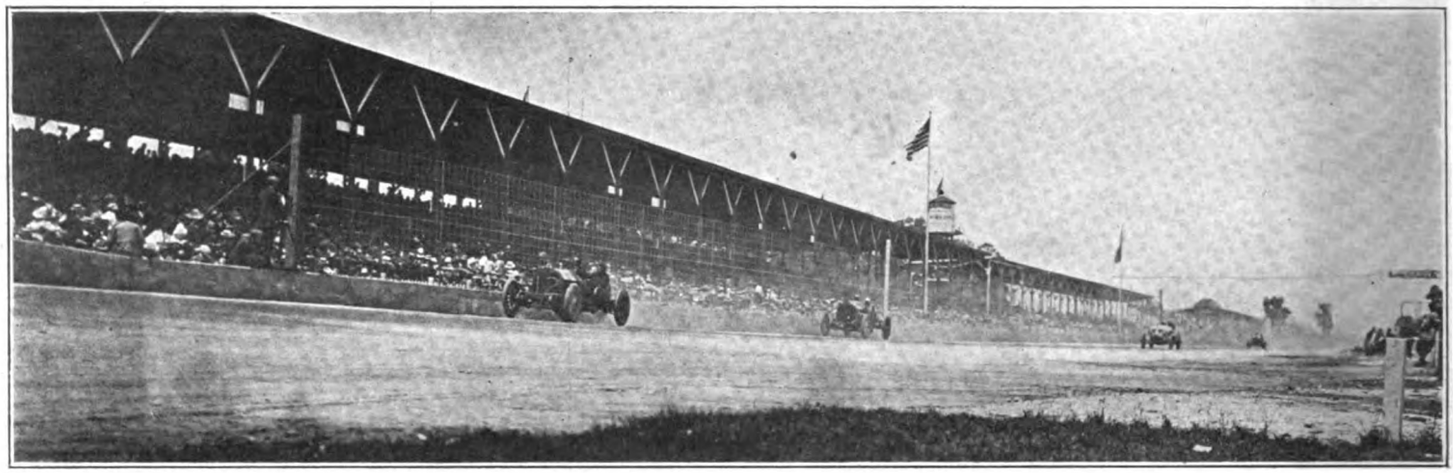


DE PALMA PUSHES HIS DISABLED CAR INTO THE PADDOCK



WHEN HUGHES RAN OUT OF FUEL

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WHERE NO GRASS GREW—ON THE "STRETCH," SHOWING DINGLEY LEADING DAWSON AND DISBROW

them were dry. The main road had been oiled, and those who travelled that way and took chances on getting into the enclosure before noon, were in comparative comfort. Side roads and back roads were very much travelled, however—that they are travelled continually was evidenced by their poor condition and the superabundance of ruts and foot-deep holes—and the dust that was raised brought fond memories of bygone days, when all night long a procession of cars trailed out on Long Island, New York, for the Vanderbilt races that have been.

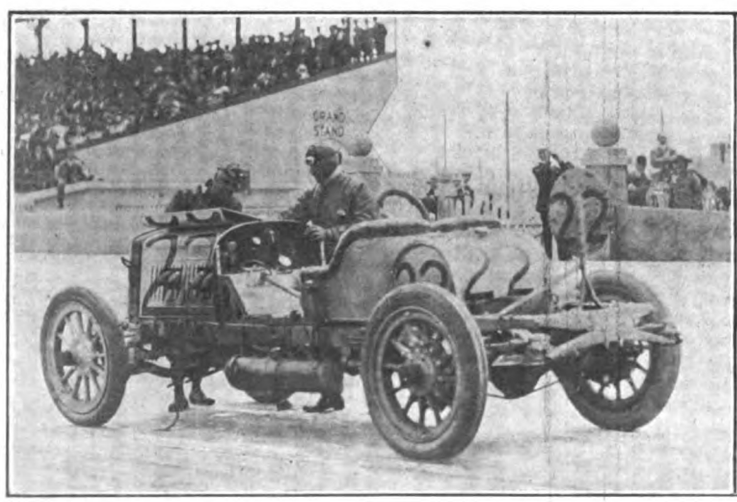
Inside the immense enclosure, everything was law and order. It is one of the peculiarities of the Indianapolis Speedway that the management always succeeds in obtaining guards and ushers who know their business and the business of their employers. Consequently, confusion was absent despite the fact that the crowd on hand was really tremendous. Everywhere there was a hurrying and a bustling, though, thanks to the suspension of numerous canvas signs indicating the location of sections and seats, no one but a blind person could be at a loss to locate his or her seat. The blind persons, if there were any, were deposited in their respective chairs by ushers, whose looks belied them, inasmuch as they were courteous and considerate, even though most of them were armed to the teeth, so to speak. Whether or not the deadly-looking revolvers and rifles, which were conspicuously displayed, were loaded with real powder and ball was not divulged, though it was freely hinted that infractions of the cast-iron rules would invite dire catastrophy to the offender.

De Palma's Pace Which Dawson Completed.

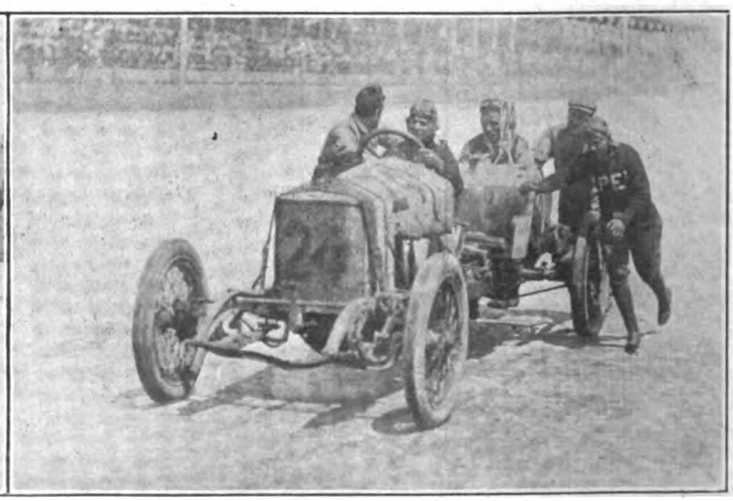
Miles.	Time.	Driver.
20	14:28	De Palma
40	29:19	De Palma
60	43:59	De Palma
80	58:33	De Palma
100	1:13:01	De Palma
120	1:27:26	De Palma
140	1:41:52	De Palma
160	1:56:04	De Palma
180	2:10:26	De Palma
200	2:24:26	De Palma
220	2:40:40	De Palma
240	2:56:23	De Palma
260	3:10:50	De Palma
280	3:26:53	De-Palma
300	3:43:21	De Palma
320	3:57:44	De Palma
340	4:12:17	De Palma
360	4:26:53	De Palma
380	4:41:47	De Palma
400	4:56:34	De Palma
420	5:12:27	De Palma
440	5:27:10	De Palma
460	5:43:14	De Palma
480	5:58:16	De Palma
500	6:21:06	Dawson

The track itself was in almost perfect condition. Heavy rains during the two or three days previous had washed the surface until all but a little of the coating of grease and oil which had accumulated during the preliminaries was cleaned away. In the work of cleaning the track, nature was assisted by a battery of workmen with hose and buckets of lye, and by the time of the race there was reason for no complaint. On the steeply banked turns, where even the cleanness of the surface scarcely was sufficient to prevent slight skidding, gangs of men had spread sand. That the efforts of those who had the race in hand were efficacious in reducing to the minimum the chance of accident was borne out by the unusual scarcity of skidding, which last year was one of the features of the race.

Taken all in all, the race was not the spectacle it was last year, when 40 cars lined up for the start and there was "something doing," in the true sense of the words, every minute of the time. Last year it scarcely was possible to look at the



HORAN (LOZIER) HALTED IN MIDDLE OF TRACK



ORMSBY (OPEL) DOWN AND OUT OF THE RUNNING

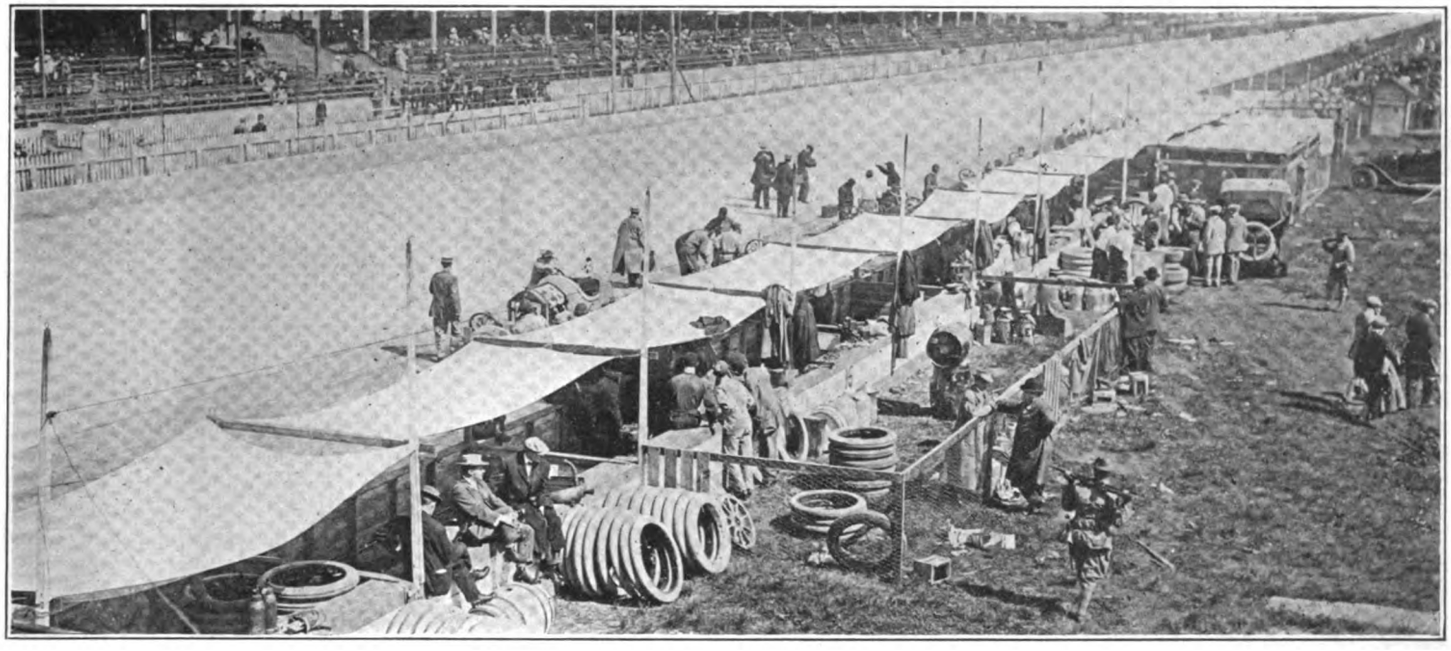
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track without seeing eight or ten cars tearing down the "stretch," but this year there were many times when the spectators had waits that seemed interminable before even a single car came into view around the northwest turn; in reality the periods of seeming inactivity were not more than half a minute in length during the first stages of the race, though toward the end, when half the cars had been eliminated, the time was double that much. But it was a good race—good in the sense that it brought out surpassing speed and a surprising scarcity of accidents—and there is little doubt but that it will be staged next year and the year after and the year after that until it becomes known as a "classic," though usually a race that is run two years in succession takes that title upon itself unbidden.

unmarred by fatal accidents. As a matter of fact, the race was remarkably free from accidents, despite the superabundance of tire trouble, and the few mishaps that occurred resulted in scarcely more than scratches for those who were involved.

As was the case last year, scores were posted on immense blackboards facing the grandstands, and though the tallying was more accurate, it still left much to be desired; no attempt was made to post the names or numbers of drivers as they retired, though manifestly it would have been a simple matter to do so. Incidentally, discrepancies between the score boards and the announcements of the judges cropped up continually. Despite such difficulties, however, those who made it their business to keep track of the cars were fairly well

really big races, and in all probability he will do so for many years to come. And also, he was the same Fred Wagner that has become familiar to race drivers and enthusiasts all over the country. Not even leather puttees and the yachting cap were missing to complete the picture. Ray Harroun was there, too, as a very active assistant to Wagner. But he was a very much altered Harroun to those who remember him as a grimy victory-elated Marmon pilot. He was togged in a brand new light brown Norfolk suit of most approved racing cut, and appeared every inch the gentleman of leisure. He was not a gentleman of leisure, however—at least, during the time he was on the track. His activity was second only to that of Wagner, whose quick action is one of his peculiarities.



GENERAL VIEW OF PITS AND GRANDSTAND TWO HOURS BEFORE THE BATTLE BEGAN

Of the 27 cars that were entered, but 24 came to the line for the start; of these, only 10 survived the long grind, the other 14 dropping out at distances varying from 17 to 497 miles. Charles Shambaugh's reconstructed Buick—as already has been told, it was once a "four" but became a "six," and in the making over was supposed to have acquired speed that was nothing short of remarkable—never showed up at all. It was said that the car could not make the 75 miles an hour required for eligibility, much less run to its expected form. Of the other two, the Continental "shark," which had been rid of its fish-like tail, broke a connecting rod in practice and could not be repaired in time. The diminutive Mason entry failed to qualify in the elimination trials, despite a most careful grooming; it had only 243 cubic inches piston displacement.

It was a great race, well run, and it is doubtful if there were many among the spectators who were of a sufficiently morbid disposition to express regrets that it was

looked after, a direct wire from the judge's stand to the press stand permitting constant communication between them. The available space in the press stand was inadequate, however, and the officials have not yet waked up to the fact that to accord those in it the best view of proceedings it should have been placed at an angle to the "stretch" and facing up the track.

Probably the only blot which marred an otherwise excellently staged and managed race is the fact that the time by laps of all the other drivers except De Palma still reposes with the officials. Immediately after the race, the mile-long reels of paper from the Burroughs adding machines and the Warner timing apparatus were checked and rechecked, and though it is said by American Automobile Association officials in New York that the results have been forwarded from Indianapolis, they evidently have gone astray somewhere on the road.

Of course, Fred Wagner officiated at the start. He always has started nearly all the

The proceedings preceding the actual start of the race were almost exactly the same as they were last year. First, all the cars were brought out for the official brake tests and none failed to come up to the requirements of Referee Pardington. Then they were sent back to the "paddock" for a last and final "touching up" before they were called out, one by one, introduced to the crowds in the grandstands by a leathern-lunged megaphone man, officially photographed a few times and sent away on a one-lap exhibition trial, which most of them were content to make at moderate speed.

The start was scheduled for 10 o'clock—which means 9 o'clock in New York and points east of Buffalo—and at about 15 minutes before the hour the cars were driven out and lined up according to their numbers, No. 1 Stutz, with Gil Anderson driving, taking the pole position just behind Carl Fisher's white car, which was to lead the procession on the first round. Len Zengle, at the wheel of the No. 2 Stutz

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pulled in next his brother pilot, the complete list of those who started being as follows:

No.	Driver.	Car.
1	Gil. Anderson	Stutz
2	Len Zengle	Stutz
3	Teddy Tetzlaff	Fiat
4	Ralph De Palma	Mercedes
5	Louis Disbrow	Case
6	Harvey Herrick	Case
7	Spencer Wishart	Mercedes
8	Joe Dawson	National
9	Howard Wilcox	National
10	Harry Knight	Lexington
12	Bert Dingley	Simplex
14	John Jenkins	White
15	Robert Burman	Cutting
16	Lee Frayer	Firestone-Columbus
17	Wm. Liesaw	Marquette-Buick
18	Wm. Endicott	Schacht
19	Ralph Mulford	Knox
21	Hughie Hughes	Mercer
22	Joe Horan	Lozier
23	Mel. Marquette	McFarlan
24	Len Ormsby	Opel
25	Joe Matson	Lozier
28	Chas. Merz	Stutz
29	David Bruce-Brown	National

From an esthetic point of view, the actual start of the race and the immediate preliminaries were more impressive than was the case last year; it was as if the promoters had profited by their experience. When the noise of the first of the one-minute bombs punctured the comparative quiet, drivers and mechanics assumed positions beside their charges as if by a pre-arranged signal. Last year six bombs at one-minute intervals were used, but this year four sufficed, and as the second exploded the drivers slid in behind their steering columns, chatting the while among each other and "kidding." No one seemed to be in a hurry, and no one seemed to be nervous, except those in the grandstands who stood in a body, most of them with watches in their hands. At the sound of the third bomb, the 24 mechanics, almost as a man, walked out in front of their machines, gave their cranks a couple of whirls, which had the effect of converting the area immediately in front of the judges' stand into a miniature inferno, what with the thick blue smoke and the roar of the exhausts. Carl Fisher, too, mounted his white roadster and waited calmly enough for the final bomb that was to send the 24 drivers out after the $50,000 in prizes.

The last bomb, let off exactly on the tick of 10 o'clock, was larger than all the rest, and as a miniature parachute freighted with an American flag dropped out of the fragments of the shell like a butterfly emerging from its chrysalis, the pack went off in half cry after Fisher's fleeting roadster. There was a fairly stiff breeze blowing out of the northwest, and the cars were fairly unmasked as they circled the track amid cheers and hand-clapping. The preliminary lap was made at approximately 40 miles an hour, and when the cars straightened out and headed down the "stretch" the formation was exactly the same as it was when the last bomb exploded.

At the completion of the lap, Fisher pulled over to the inside of the track and the race was on. It was one of the prettiest and fairest starts that ever was made. There were 16 less cars on the track than there were in the race last year, and the intervening distance between them was proportionately increased. All the drivers had plenty of "elbow room," though close watching and plenty of quick action was necessary at times to prevent rear end collisions, for there were those in the rear ranks who wanted the honor of being the first over the line the first time around.

But Tetzlaff forced his big red Fiat over first, his time for the first lap being 1.43, and giving abundant indication of the average speed that the winner might be expected to make, barring an unusual amount of tire trouble, of course; he circled the 2½ mile oval at the rate of 85.30 miles an hour. De Palma, with his big gray Mercedes humming, next plunged over the wire, scarcely a fraction of a second later, and almost on his heels Spencer Wishart, in the twin Mercedes to De Palma's, shot over. Thus it was that the first three cars to cross the wire were three out of the four chain-driven machines in the contest. Bert Dingley's Simplex was the only other chain-driven car in the race, the others all being of the orthodox shaft-driven type.

The second lap was practically a repetition of the first, the only difference being that Harry Knight in his six-cylinder Lexington had pushed up from one of the rear ranks and was trailing the three leaders. The others were bunched almost in a solid phalanx a little further back, and they stayed in this formation until the completion of the 6th lap, when the racking pace commenced to tell and Ormsby's Opel, which up to that time had given promise of greater things to come and was running well up among the leaders, suddenly quit far up on the stretch and was pushed down in front of its "pit" by the driver and his mechanic and a couple of attendants. More than a cursory examination was not necessary to reveal that a piston had gotten loose somehow or other and been forced through the top of one of the cylinder heads. Needless to add, the car was hopelessly out of the race after having covered only 7 laps. Almost immediately afterward, Harry Knight's Lexington gave indication of trouble of some kind, and after having been at the "pits" for quite a time, was pushed around into the paddock with seven consistent and fast laps to its credit. Engine trouble was said to have caused its withdrawal, though information of any kind was surprisingly scarce.

Tire trouble, which last year was one of the features of the race, commenced to manifest itself as early as the 8th lap, when Louis Disbrow in the No. 5 Case drew up at the pits with an empty right front tire that almost in the twinkling of an eye was exchanged, wheel and all, for both the Case cars were equipped with wire wheels, for an inflated one. Almost as Disbrow shot away from the attentions of his pit attendants, his team mate, Herrick, in the other Case, drew up for some sort of a minor engine adjustment. The hood was removed, the mechanic stuck his hands into the throbbing vitals of the big engine, slammed the hood back in place, and Herrick vanished around the near turn with less than a minute's loss of time.

In the meantime the crowd had its eyes on that part of the six feet of Bruce-Brown that could be seen as he flashed by in No. 29 National. By the 11th lap he had worked himself up into second place and was flitting around the oval closely followed by Mulford, whose six-cylinder Knox was the noisiest car on the track, with Tetzlaff then in third place, De Palma, already giving evidence of the speed held in reserve, in fourth, and Bert Dingley in his Simplex fifth. The others still were pretty well bunched behind, though they were commencing to string out, owing to the necessity for frequent stops for tires. Brown still held his lead, which was a slim one, in the 12th lap, and Mulford was second, though his car manifestly was giving trouble. His trouble was a slipping clutch, and though he held his place well for a time, it was not long before he commenced to drop back, and to all intents and purposes ceased to be a factor in the race after the first hundred miles. His engine, however, was one of the healthiest sounding engines on the track, and it was with a pang of disappointment that it was realized his clutch disease was too serious to be cured in time to allow him to fight it out with the leaders.

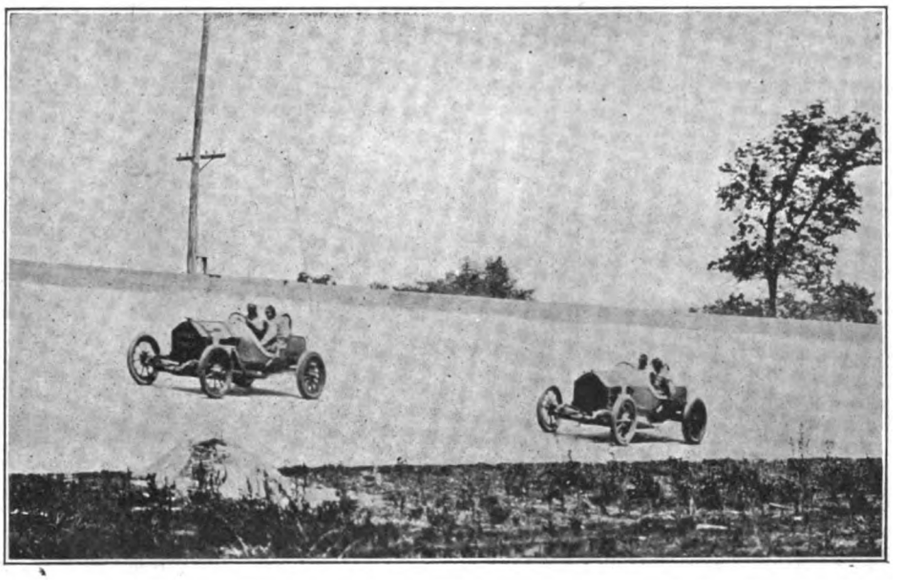
The two Lozier cars, with Matson and Joe Horan at their wheels, respectively, caused smiles in the grandstand because for a long time they stuck pretty close together. Seemingly nothing could separate them, until in the 19th lap Matson had to stop for tires, and thereafter the two white cars seldom were seen together. Spencer Wishart was the first of the three leaders to pull up at the "pits," and in the 14th lap, when he was running third place, he stopped for fuel and oil. So great was his lead on the others, however, that the 30 seconds he lost were not sufficient to cost him his place.

It was at about the 30-mile mark that De Palma first showed in front of the bunch, and from that time up to the 497th mile he never was ousted from his place. There seemed to be something positively uncanny in the way he handled the big Mercedes, and the lead that he opened up on the others gradually increased. One of the unusual features of his performance was that for 200 miles he never stopped. It was nothing short of remarkable the way he kept the tires on his heavy machine (it weighed 2,780 pounds), and was a tribute both to the tires themselves, which were Michelins, and the clever way in which he drove.

The 40-mile mark was passed in 29.19, an average speed of approximately 81 miles an hour, with De Palma leading, Bruce-Brown second and Mulford third, which positions they held up to 50 miles, when De Palma pulled down his first record, which up to that time had stood at 39.20. That is to say, De Palma made better time—he covered the

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distance in 36.39—but it won't be a record, because, according to the rules of the American Automobile Association, no records for intermediate distances can be allowed under any conditions unless the claimant finishes the race. Consequently, all the records that he smashed from the 30-mile mark up to the 490-mile mark are no records at all.



ZENGLE AND ANDERSON, STUTZ PILOTS, ON NORTHWEST TURN

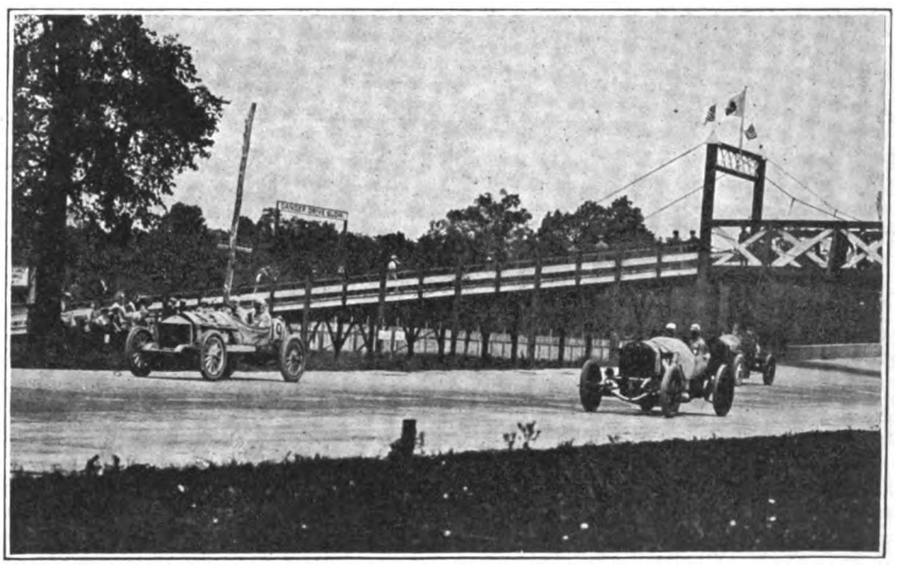
In the interim between the 30-mile mark and the 50-mile mark things had been happening. Joe Matson in his Lozier stopped in his 19th lap; Mulford stopped in the 20th lap; Herrick stopped in his 18th lap, and Johnny Jenkins, in the six-cylinder White car, stopped in his 22d lap. All of them put on new right rear tires. As a matter of fact, the number of right rear tires that went bad was one of the features of the race. It was seldom that a car pulled up with any other tire bursted, though later the right front tires commenced to give out.

At 60 miles, De Palma's time was 43.59. Bruce Brown was trailing him a close second, and Mulford was right behind, with very little time between him and Brown. But Brown's triumph was short lived, for in the 25th lap, when he had covered 62½ miles, he pulled up at the pits with an engine that was dead for all time, as far as the present race was concerned. A broken piston caused his downfall, and though no expressions of regret over his withdrawal were heard from the grandstands, as there were last year when Harry Grant was forced out, the silence which followed the announcement by the megaphone man was suggestive of how high the feeling ran. Later it was said that the big popular idol was weeping like a baby because of his untimely end.

In the meantime Hughes, whose waspish yellow Mercer had attracted little attention for the simple reason that it had been running perfectly, commenced to be noticed, for he was hanging to the big fellows, despite the fact that the piston displacement of his car was only half that of the leaders. He made his first stop for tires in his 21st lap, a right rear shoe going out with a great bang directly in front of the grandstand. Of course, he had to make a complete circuit on three tires and a rim, and for the first time in the race the curious phenomenon of the unshod wheel turning backward when the brake was applied became apparent. It was doubly noticeable, because the car was equipped with wire wheels. Another of the noticeable features of all the wire-wheeled cars was that as they rounded the near turn a distinct hum as the wire spokes churned the air was distinguishable. On the straight stretches it was not noticeable, of course, for the motors then were making the maximum noise emitted from them.

As the 80-mile mark was passed, the time for the distance being 58.33, Joe Dawson commenced to show the stuff of which he and his car were made. From fourth place, which he had held consistently, he had worked himself up to second, which position he held up to 200 miles. His car was running beautifully, and, like De Palma, he ran almost the whole 200 miles without a tire change. His first change was made in his 79th lap. It was just about here that Mulford's clutch trouble commenced to manifest itself in a manner that was unmistakeable. As the big car roared down the track the engine made a frightful noise, but the car made scarcely more than 50 miles an hour, and Mulford dropped out of third place and before long trailed the bunch, "Spence" Wishart taking his place and continuing the running as third. The time for 100 miles was 1:13.01, which figures out at the rate of 82 miles an hour.

At 120 miles, De Palma and Dawson held first and second place, respectively, though there were a couple of laps between them. Wishart, however, who had been third, had experienced tire and engine trouble and had dropped back three laps behind De Palma. Tetzlaff, who had been hanging onto Wishart like grim death, promptly moved up and took his place. The time for the 120 miles was 1:27:26, or 87 minutes 26 seconds. Wilcox, who had the remaining National in his charge, had suffered an abundance of tire trouble and also some engine trouble and had dropped back 16 laps behind De Palma when the 120-mile mark was passed.



THREE PRIME FAVORITES BUNCHED—MULFORD, DE PALMA AND BRUCE-BROWN

De Palma still held tightly onto first place at the 160-mile mark and Dawson could not be dislodged from second. Similarly, Tetzlaff showed no inclination to let any one take third place away from him. The time for the distance was 1:56:14 and the thinning down of the ranks had commenced in earnest. Lee Frayer went out when he was running well in his 43d lap and was five laps behind De Palma. A broken valve caused his withdrawal. Harvey Herrick, in the No. 6 Case, retired

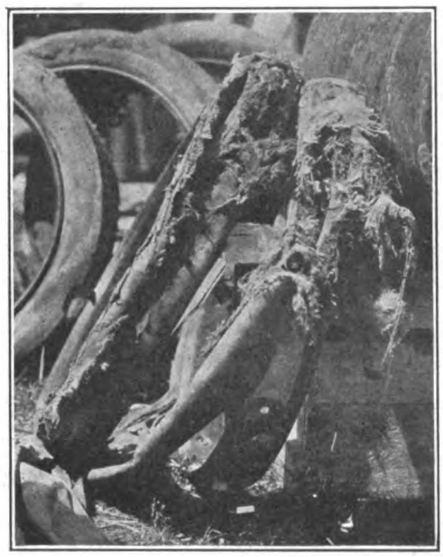
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when he was in his 55th lap and was 11 laps behind De Palma, and shortly afterward, or when he had covered 157 miles, Marquette, who had the mount on the McFarlan car, had a bad accident up on the steep embankment at the northwest turn. That is to say, the accident was bad for the car, which was too much smashed up to continue, and remained exactly where it was during all the rest of the race. The trouble was caused by the blowing out of both rear tires at the same time, and in the skid which followed both wheels on the right side of the car were ripped off. No one was hurt. At that time Marquette was running but five laps behind De Palma and had made two stops for tires. Ten miles further along the route, when he had just completed his 67th lap and was then some 10 laps behind De Palma, Louis Disbrow, in the other Case car, followed his partner, Herrick, to the paddock, after a game drive punctuated by much tire trouble. On the back stretch he blew out both rear tires at the same time and sheared off a differential pin.

There were by then 17 of the original 24 starters left in the race, but the elimination did not stop there, and before the 200 mile mark was reached two more cars fell by the roadside, knocked out by the terrific pace. Wm. Liesaw, in a Marquette-Buick, was the next man to quit the race, a carburetter fire in his 72d lap so disarranging his engine that he was forced out. Shortly afterward, Gil Anderson, in the No. 1 Stutz, also joined the ranks of the defeated, a collapsed wheel in his 80th lap bringing him to grief. Anderson drove a game race while he lasted, and had it not been for the broken wheel might have been expected to finish "in the money."

All this time De Palma was "looping it out," 180 miles having been covered in 130 minutes and 26 seconds, and when the 200-mile mark was passed he had opened up still another lap between himself and Dawson, who still hung onto second place, closely followed by Tetzlaff in his Fiat. It was in the 200th mile that De Palma made his first stop to change a tire, and the "big hand" he got from the stands as he got away after a remarkably quick tire change went far to prove the popularity of the slender Italian. A little later, Dawson, too, stopped to change a burst right rear tire, and the innovation he received scarcely was less than that tendered De Palma. At that time Hughes in his Mercer was only four laps behind De Palma and was going great guns. Another of the smaller cars that made an excellent showing was the Schacht car, driven by "Farmer Bill" Endicott. The car ran like a watch throughout the whole of the race, and despite the fact that its piston displacement was only 389 cubic inches, was only six laps behind De Palma at the 200-mile mark.

Soon after the 80th lap, Caleb Bragg, who has made a name driving Fiat cars, relieved Tetzlaff and held the wheel for upwards of 100 miles. Tetzlaff then had displaced Dawson as second man because the National pilot had made the greater number of tire stops. In his 84th lap, Bragg stopped for all new tires and also had his gasolene and fuel tanks filled up, thereby allowing Dawson to pick up approximately one and one-half laps, though not enough to win back his second place. It was about this time that Spencer Wishart's Mercedes commenced to experience engine trouble, and after a short stop in his 82d lap for tires, fuel and oil and a hurried engine adjustment, he pulled up again in the next lap, and the chunky-looking car that had gained its driver many firm backers because of its speed, was trundled off the track and into the paddock with a broken water connection.



TIRE HAVOC WROUGHT BY SPEED

But 14 of the original 24 starters now remained on the track, and at times the gaps between cars caused periods of inactivity that became almost monotonous. There was an almost continual smell of burned rubber in the air, and the tires that were taken off could be seen smouldering—mute evidence of the terrific strain imposed upon them. At 220 miles there was no change in the line-up except that Burman, who had a monstrous Cutting, which had been whirling around the track at dizzy speed, crawled up into fourth place, where he stayed until the 300 mile mark was passed.

When the half-way post in the long grind was passed the position of the 14 drivers and cars still in the race was as follows: De Palma (Mercedes), Tetzlaff (Fiat), Dawson (National), Burman (Cutting), Hughes (Mercer), Merz (Stutz), Endicott (Schacht), Zengle (Stutz), Horan (Lozier), Jenkins (White), Matson (Lozier), Mulford (Knox), Wilcox (National), Dingley (Simplex). De Palma's time for the 250 miles was 3:03:34, which figures out at the rate of close to 82 miles an hour. He was then 14 minutes and 15 seconds ahead of Ray Harroun's time, which was 3:17:49.

Up in the grandstands and the bleachers the crowd almost seemed to tire of the race at this stage, for there were not many cars passing at a time and it seemed as if there was little competition, a condition which was augmented by the fact that De Palma was two laps ahead of Tetzlaff, who was second, and three laps ahead of Dawson in third place. Though the sun had been shining brightly all morning (it was then 1 o'clock according to the New York clocks), the air still was chilly, and those who were sheltered from its direct rays in the back of the grandstand pulled their coats closer about them. Down in the front rows, spectators basked in the sun, though none were seen to remove their coats.

It was shortly after the 250-mile mark was passed that Hughie Hughes furnished the crowd with an amusing incident, and incidentally lost much valuable time. He was noticed slowing down on the "stretch," and almost immediately he came to a dead stop about a quarter of a mile from his supply station. Then Hughes and his mechanic dismounted and proceeded to push and tow the quiet Mercer down to the "pits." He had used up the last drop of fuel in his tank. After but a momentary stop, he whizzed away again, and took up the running four laps behind De Palma.

Tetzlaff still held second place at 260 miles, with De Palma leading, as usual, and Dawson a close third. Burman, who had been travelling fast in his monster Cutting, which was among the few with disked wheels, stopped in his 104th lap for gasolene, and when he got away the spectators clapped and cheered, for the so-called "Speed King" looked like a good bet. De Palma and Dawson were then racing round neck and neck, and though two laps separated them it looked like a real race, and the crowd in the grandstands cheered.

About the only thing the guards could not keep off the track was an immense jack rabbit that skuttled out almost as De Palma stopped for tires in his 112th lap. After futilly attempting to scale the cement retaining wall, the rabbit scampered back toward the pits. None of the guards shot at him, and he never knew how close he came to "passing in his chips," for Bert Dingley thundered past in his Simplex and missed him by inches. The necessity for tire stops again became urgent with many of the drivers, and Merz, Endicott and Zengle drew up almost at once. As Merz and Zengle both were on their 103d lap and Endicott was only a lap behind, it became a scramble to see who would get away first, and the way pit attendants slopped gasolene and oil all over the drivers, who remained seated, was a caution.

Don Herr relieved Dawson in the 270th mile and drove for 100 miles, the National car then being in third place behind Tetzlaff, who had assumed the wheel of the Fiat again. De Palma still maintained his lead. Shortly afterward Joe Matson, in the No. 25 Lozier, succumbed to a burned-out

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bearing, and left only 13 of the original starters in the race. Matson had been going well and had covered 275 miles when he retired. Two hundred and eighty miles were covered in 3:26:53, which figures out at a fraction more than 81 miles an hour, with the four leaders as follows: De Palma, Tetzlaff. Dawson, Burman. At 290 miles Bert Dingley and his Simplex pulled into the pits with a connecting rod forced through the crankcase of his engine, leaving but 12 survivors. Dingley was 24 laps behind De Palma when he quit.

Going strong up to that time, Tetzlaff stopped in his 115th lap, when he was in second place, to replace a tire and make some minor engine adjustment. But in stopping, he lost all chance of second place, for Dawson immediately "opened up" and



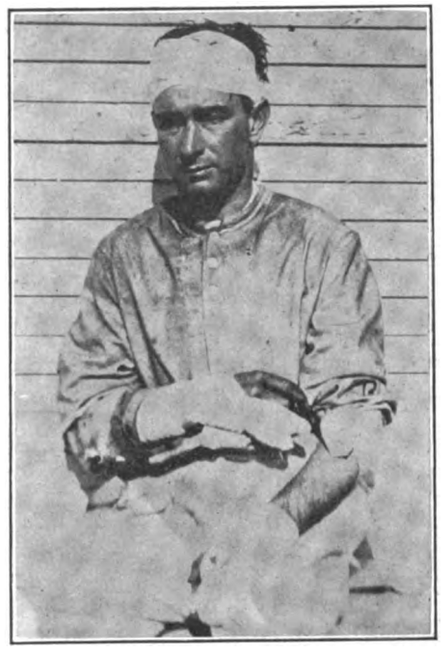
HUGHES—HIS SMILE

slid in ahead of him and never was displaced. Tetzlaff then went into fourth place, Burman, too, having slid in between him and De Palma. The time at 300 miles was 3:43:21.

At 320 miles the formation remained the same, with Merz in No. 28 Stutz bringing up the rear. A little later Knipper relieved Merz, but drove for only a few laps, when Merz again took the wheel. From then on to 350 miles there was little to relieve the monotony, the only difference being that Merz moved up to fourth place when Burman stopped for tires. Hughes then was running in sixth place, trailed by Joe Horan in his white Lozier. The time at 350 miles was 259 minutes, 35 seconds. Dawson was then six minutes behind De Palma, according to a bulletin issued by the judges. At 360 miles, which was passed in 4:26:53, the positions of the cars were the same, though 20 miles further along the route Burman had again worked up into fourth place and Merz had dropped back to sixth behind Hughes and in front of Horan. But the bright things that were expected of Burman came to naught, for in his 395th mile he had a bad spill in the back stretch that wrecked his car and all but wrecked him and his mechanic. Fortunately, however, neither was hurt seriously; Burman was cut about the head and arms, but his mechanic escaped almost unscathed. The trouble was caused by two rear shoes blowing out at the same time. There were then but 11 drivers remaining in the race.

The 400-mile mark was passed in 4:56:34, which was 26 minutes 31 seconds better than Harroun made the distance last year, and from then on the race became a madder whirl of speed than ever. With but 50 miles to go the position of the ten leading cars was as follows: De Palma (Mercedes), Dawson (National), Tetzlaff (Fiat), Hughes (Mercer), Merz (Stutz), Jenkins (White), Endicott (Schacht), Zengle (Stutz), Horan (Lozier), Mulford (Knox).

At 460 miles De Palma had opened up a still greater lead on Dawson, and was 8 minutes 25 seconds ahead of him, the dis-



BURMAN, DISABLED AND DISFIGURED

tance having been covered in 5:43:14. At 480 miles and 490 miles the line-up remained practically unchanged, and the drivers commenced to let their cars out in earnest. Dawson bided his time, however, and held his car in hand. The car, incidentally, was shod with Michelin tires, Truffault-Hartford equipped, and sparked by a Splitdorf magneto.

In the 497th mile, the crowd in the stands, now on its feet, and the legion of pit workers and attendants, and the judges and every one else received probably the greatest shock of the race when De Palma, with only three laps to go, limped down the "stretch" on one cylinder, sounding for all the world like a big motor boat. National enthusiasts immediately commenced to yell like mad, and one man fell clean out of the grandstand, so eager was he to let Dawson know that at last he had the chance he was waiting for.

De Palma's downfall was the first real thrill of the race, and the excitement was tremendous. Never was the meaning of the old saying, "The king is dead, long live the king!" so aptly illustrated. When Dawson came around, with eight laps to go, the crowd simply howled, and for the instant De Palma and his trouble was forgotten. The plucky Italian disappeared around the grandstand turn, barely limping along on one cylinder, and when next he appeared, far down the stretch, he was running alongside his car, with his mechanic on the other side, trundling the heavy machine to the line. But Dawson had crossed the line a winner, with De Palma still two laps from the finish. It looked at first as if De Palma were going to push his Mercedes around the track the remaining two laps, in order to finish in the money, for he was sure of a prize, even if it took him all night to get around. But he quit when he got to the paddock gate, and there were few, very few, indeed, who could repress expressions of praise for the masterful way in which De



DE PALMA SMILES ALSO

Palma had driven and the sportsmanlike manner in which he accepted defeat.

As already has been told, Tetzlaff was the second man to cross the finish line, and he was followed by Hughes in his Mercer, the positions and times of the other seven to finish being given in the accompanying table. At the time that Wilcox crossed the line in ninth place Mulford still was hammering away some 30 laps further back. Though Referee Pardington suggested that he be flagged and given 10th place, the Speedway officials insisted that he finish the race, and for two hours more, with no one to look on but two of the officials, Mulford plugged around at about 50 miles an hour, with a sandwich mostly in his mouth and partly in his free hand. He finished in 8:53:00, and got the $1,200 10th place prize.

The prize of $20,000 which De Palma came so near to getting went to Dawson, as a matter of course, and Tetzlaff pulled down $10,000 for second place. Not including "incidentals," of which all the drivers got a slice, the money prizes won by the other drivers were as follows: Hughes, $5,000; Merz, $3,000; Endicott, $2,500; Zengle, $2,000; Jenkins, $1,500; Horan, $1,400; Wilcox, $1,300; Mulford, $1,200. Though De Palma thus received none of the money in consolation for his defeat, the Bosch Magneto Co. tendered him a check for $250 on the eve of his departure to drive in the French Grand Prix race.

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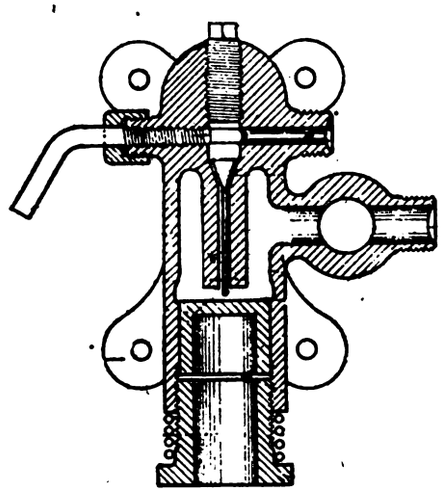
OLD IDEA IN NEW ENGINE STARTER

Vacuum Principle Advantageously Employed in a Detroit Invention—Assists Mixture—Permits Easy Variations.

In order to make the starting of a motor easy, it is usual to switch off the ignition when stopping and allow the motor to make its last few revolutions with the throttle open, so that the cylinders will be filled with combustible gas, which may be ignited by switching on the retarded spark if the motor has not in the meantime stood long enough for the gasolene to condense. It is this principle of the in-drawing of gas that is employed in the Vacuum Automatic Starter, a new device that just has been brought out by the Vacuum Automatic Starter Co., of 50 Shelby street, Detroit. Owing to the fact that the suction of the motor itself is pressed into service to charge the cylinders, the construction of the apparatus, which is clearly shown in the accompanying illustration, is extremely simple, consisting essentially of two automatic valves and a hand-operated shut-off for throwing the starter into and out of service.

Acetylene gas is piped to the starter at the top, where the tubing is attached as shown at the left side of the illustration. Just below the level of the gas inlet, in the center, is a conical valve held on its seat by its own weight and the pressure of the gas above it. The stem of the conical valve projects downward through a long guide which it does not fill closely, and extends a little below the lower end of the guide. Below the conical valve there is a comparatively large cylindrical chamber in which is a sliding piston-like member which, however, is cut away so that air can pass up between it and the walls of the chamber. This piston is held in place by a retaining screw, bored out to allow the passage of air, and made adjustable, there being a knurled head to turn it by and a retaining spring to keep it from shifting when set. On the right hand side of the starter is the shut-off valve, which is operated by a small knob on the dashboard, and beyond this valve the connection for a pipe which leads direct to the intake manifold of the engine. The starter is mounted on the engine side of the dash with the shut-off valve handle extending through a half-inch hole in the dash.

The cylinders of the motor are charged with gas just as they are in the familiar manner, except that when the Vacuum automatic starter is used both throttle and ignition are shut off and the starter valve is opened a quarter of a turn. The suction of the motor pistons, communicated to the starter through the pipe leading from the manifold causes the sliding piston to rise and, in rising, to lift the conical valve by striking the lower end of its stem. This permits acetylene gas from the upper inlet to flow down past the stem of the conical valve and into the mixing chamber, where it mingles with the air rising through the spaces provided for the purpose around the sliding piston. The air and gas, thoroughly mixed, pass to the intake manifold of the motor through the connecting pipe and are taken into the cylinders, which thus are filled with a mixture that is properly proportioned to give the best results. The starter is intended to give the cylinders a mixture containing 15 per cent. of acetylene gas; the proportions can be varied by adjusting the knurled screw already referred to. The actual starting is effected by retarding the spark and throwing on the



"VACUUM" STARTER VALVE

switch. As the acetylene gas will not condense, the motor should start even if it has stood over night. Gas from the starter cannot enter the cylinders when the starter shut-off valve is closed, because the conical valve closes automatically.

If the motor is standing without charged cylinders starting is made easy, especially in cold weather, by opening the starter shut-off and cranking the motor with throttle closed and ignition retarded, of course, when the motor will start and run on acetylene until warmed up, when the gasolene can be admitted and the starter shut off. Obviously it is a simple matter to run the car on acetylene gas in case of emergency, such as the running out of fuel.

Kansas City Taxicabs Amalgamated.

The Shaw Taxicab Co., of Kansas City, Mo., has purchased the assets of the Blue Taxicab Co., which recently went into the hands of a receiver, and will be reorganized under the style Shaw Transfer Co., with $200,000 capital stock. The directors, who were chosen from the directorates of the two companies, are as fololws: J. R. Crowe, F. J. Dean, Walden W. Shaw, John Hertz and Newton Wagner. J. B. Uhl, manager of the Shaw Taxicab Co., will become general manager of the new corporation. Each company owns about 20 taxicabs, in addition to which the Blue company operated 20 motor trucks, having exclusive rights to the Union Depot business in Kansas City.

WEIGHTS TIRES OUGHT TO BEAR

Sizes and Their Capacity Specified by Big Tire Company—Lack of This Knowledge Often Expensive.

In a vague way, it is quite generally known that tires ought not to be overloaded and that they cannot be expected to last as long as they ought to if they are forced to sustain more weight than that which they are designed to carry. Exact knowledge on the subject, however, is rare, and even owners of cars, as a rule, are very much in the dark as to whether their tires are normally loaded or are carrying excess weight. According to the United States Tire Co., which naturally has very decided views on this subject, one of the direct results of overloading is the breaking down of the side walls of the tires, weakening them and impairing their resisting qualities, until finally a blow-out occurs.

It is not a difficult matter to ascertain exactly how much weight a set of tires is carrying; it is necessary only to weigh the front and the rear of the car separately—with its full load of passengers—and by comparing the figures so obtained with those given in the table prepared by the service bureau of the United States Tire Co. it will be easy to figure out how the tires are loaded. The table is as follows:

	Rear Weight per Wheel.	Front Weight per Wheel.
28 x 2½	225 lbs.	275 lbs.
28 x 3	350 "	425 "
30 x 3	375 "	450 "
32 x 3	375 "	450 "
28 x 3½	425 "	500 "
30 x 3½	450 "	550 "
31 x 3½	475 "	575 "
32 x 3½	500 "	600 "
33 x 3½	525 "	625 "
34 x 3½	550 "	650 "
36 x 3½	600 "	700 "
30 x 4	625 "	750 "
31 x 4	635 "	775 "
32 x 4	650 "	800 "
33 x 4	675 "	850 "
34 x 4	700 "	875 "
35 x 4	735 "	885 "
36 x 4	750 "	900 "
40 x 4	850 "	1000 "
42 x 4	900 "	1050 "
32 x 4½	750 "	950 "
34 x 4½	900 "	1125 "
35 x 4½	935 "	1175 "
36 x 4½	975 "	1225 "
37 x 4½	1010 "	1260 "
38 x 4½	1050 "	1300 "
42 x 4½	1200 "	1450 "
34 x 5	950 "	1200 "
35 x 5	1000 "	1250 "
36 x 5	1050 "	1300 "
37 x 5	1100 "	1350 "
39 x 5	1200 "	1450 "
43 x 5	1400 "	1550 "
37 x 5¼	1150 "	1400 "
38 x 5½	1200 "	1450 "

One of the secrets of keeping soldering irons in the best working conditions is to avoid overheating them. Solder will not adhere to an iron that is too hot, and it is a "trade crime" for a tinsmith to allow an iron to become red hot.

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POTATOES CHRISTEN HENDERSON

Band Plays While Mayor of Indianapolis "Does the Deed"—Novel and Spectacular Launching of New Car.

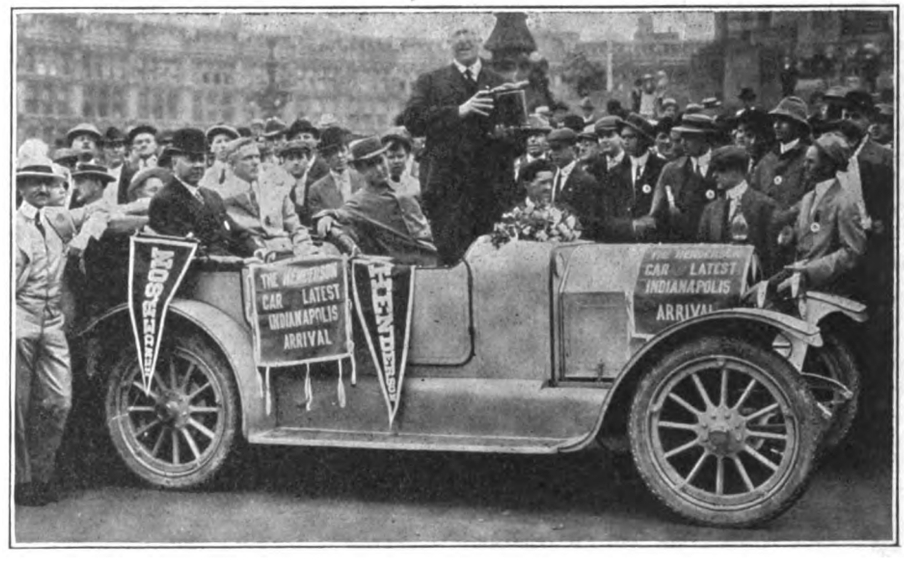
Though there have been brass bands and parades at christenings of other sorts before, it remained for the Henderson Motor Car Co., which is the youngest Hoosier firm to invade the field, to produce them both at the christening of an automobile. Of course, the new Henderson car was the cause of it all, and the accompanying pictures serve to show that the ceremony was not a mere flash in the pan. In fact, no less than "Lew" Shank, the mayor of Indianapolis, who has acquired a reputation as the "white hope" in the battle for the reduction of the cost of living, officiated at the naming of the "infant," which occurred on May 29th.



PARADE THAT PRECEDED THE HENDERSON CHRISTENING

The proceedings commenced at University Park, where a squadron of mounted police and a goodly number of gaily bedecked cars representing the varied output of the Indiana city formed in line, with the Henderson car occupying the place of honor, and behind the Indianapolis Military band paraded slowly through the principal streets to the strains of "Hail, Hail, the Gang's All Here." Mayor Shank and Chief of Police Hyland and a number of other notables rode in the Henderson and dispensed broad smiles on the crowd which had assembled to witness the unusual ceremony.

At Monument Circle the parade was halted and the serious business of the day was commenced. The actual christening differed from other events of the kind, in that water was not used, except in the radiators of the cars. Nor was champagne used, though it is logical to suppose that it might be. The christening was done with the aid of nothing other than potatoes!—the article of food which has constituted Mayor Shank's principal offensive weapon in his war on high prices. Following an address of welcome in which he eulogized "the Hendersons of Indianapolis" and the car, Mayor Shank pronounced the stereotyped "I christen thee Henderson," and at the same time tumbled a peck of new potatoes over the hood of the car. The ceremony was completed when the mayor grasped an immense lead pencil which was half as tall as himself and inscribed his official signature on the bonnet. Later the car was pushed around the corner to the hotel Claypool and placed in the center of the lobby, the tonneau filled with advertising literature and flowers and one big potato pendant from a hook on the radiator cap. For three days, or until after the completion of the 500-mile race on the Speedway, it remained there and was examined, and when it was taken away its body was practically covered with the initials of admirers.



MAYOR SHANK PREPARING TO SPRINKLE THE POTATOES

Boston Sees Big Parade of Electrics.

In Boston, which possesses an electric vehicle club, a parade of electric vehicles exclusively is made an annual event. The second turnout occurred on Memorial Day, 30th ult., when there were in line just twice as many vehicles as paraded last year. In all there were 131 vehicles, of which 122 were "commercial" and nine pleasure cars, which carried the officers in charge of the demonstration.

THEIR EMBLEMS NOT FORTHCOMING

"Owners' Protectors" Secure the Return of Their Deposit—Why Some Radiators Have Lacked Ornamentation.

If the members of the United Automobile Owners' Protective Association have not been displaying a more or less artistic sign or emblem on their radiators, it is not wholly the fault of the association. The fact was made clear this week in the Municipal Court of New York, when the U. A. O. P. A. obtained a judgment against H. Popper & Son, Inc., of New York City, for $170.17. The Poppers were to have designed and produced the emblems which were to adorn the radiators, and when they undertook to do so they required a deposit, not for publication, but as a guarantee of good faith, and to cover the cost of necessary dues.

The deposit was duly made, but the 1,000 radiator emblems which were contracted for were not forthcoming. Just what caused the delay does not appear, but at any rate, and not unnaturally, the association demanded that its deposit be returned, and when it was refused, legal proceedings were instituted, and, as stated, the so-called association secured an award which covers not only the amount of its deposit, but interest and costs.

Exactly how many members of the U. A. O. P. A. were disappointed by the failure of the emblems to make their appearance is not known, but as it is only eight months old, it scarcely numbers 50,000, though some reference is made to that figure. The association was incorporated under the laws of New York in October last, Homer B. Ragan figuring as its president, Herbert A. Trebing as its secretary, and Albert J. Davenport as treasurer. In return for what is variously termed a "subscription fee" and

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a "membership fee" of $12.50, the association, whose printed matter refers to it variously as an "association" and a "company," proposed "to make it possible for the automobile owner to buy anything he requires for his machine at prices he cannot get as an individual." In fact, it is proposed not only to supply accessories, but to do repairing, repainting, upholstering, et cetera, and to furnish chauffeurs free of charge. It does not directly claim to have 50,000 members, but in endeavoring to explain how it does all of the many things which it claims to perform, it asks this question: "Is it not easy for you to understand that a dealer selling to 50,000 or more automobile owners can do business on a very small margin of profit selling goods of recognized standard and make more money than another dealer who depends on the passer-by for his customer?"

New York Orphans on Annual Outing.

Joy was unconfined yesterday morning, 5th inst., when, promptly at 10 o'clock, 300 touring cars, taxicabs and motor trucks provided with hastily constructed but comfortable seats, formed in single file on upper Broadway, and, laden with the chosen inmates of some 26 New York orphan asylums or similar charitable institutions, started toward Coney Island, where the "kiddies" enjoyed their annual automobile outing. Luncheon was served in the Kaiser Garten, where the children were the guests of Peter Doelger, after which the noisy caravan, for each of the 4,000-odd joy riders was provided with a tin horn, and two bands and a fife and drum corps were in attendance, proceeded toward Steeplechase Park, where George Tilyou's numerous "funny" concoctions served to amuse both young and old for the remainder of the all too short afternoon. The recall was sounded at 4.30 o'clock.

Motionless Car May Be "in Operation."

Just what, in regard to an automobile, consists in being "in use or operation" has been officially decided by Attorney General John H. Light of Connecticut, who was asked to decide whether a car left standing at the curb while its owner or driver made a call or transacted business nearby should have its lamps burning within the hours when the state law requires cars "in operation" to be lighted. After a profound study of the statute in question, Mr. Light illuminated the dark place by ruling that a car left standing in the street was "in use or operation" within the meaning of the law and so should be lighted fore and aft between a half hour after sundown and a half hour before sunrise. Prior to the decision there had been much controversy.

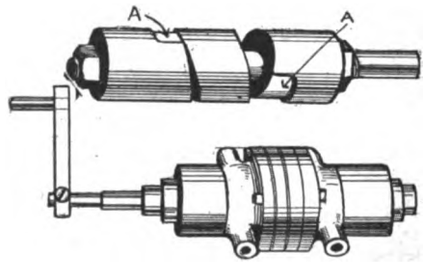
Evidence that the War is Over.

There is no longer any doubt that the Revolutionary war is over. An English manufacturer of speedometers is advertising his instrument as "the George Washington of the speedometer world."

OIL PUMP WITH TWO MOVING PARTS

Slow Speed and Simplicity Due to Novel Actuating Means—Lifting Power, Large Bearings and No Valves.

It is doubtful if there is anything, short of the actual fracture of an important part, that can cause as much costly damage to a motor as the failure of an oil pump that is depended upon to maintain the supply of lubricant. And, on the other hand, an absolutely reliable oil pump, immune from trouble of any ordinary kind would greatly simplify lubrication problems. Therefore, considerable interest must attach to the oil pump that has been devised by an Englishman, G. E. Whetman, for it is wholly innocent of valves, springs and small moving parts and the bearing surfaces are extremely large and are always flooded with oil when running.



WHETMAN'S CAM PUMP

The Whetman pump has a casing, as shown in the illustration of the complete pump, with inlets and outlets for the oil; the interior is a plain cylinder, of one diameter from end to end. The working part of the pump, shown separately, consists of a shaft, rotated when the pump is in action, upon which two side-cams are mounted with a space between them. A third cylindrical member is carried on the shaft between the side cams, and all three are of the same diameter and fit the cylindrical casing snugly, leaving just space for a good film of oil; the outer ends of the side cams fit closely against the ends of the casing. While the two side cams are fast on the shaft, however, the central member is loose on the shaft and can slide back and forth within the limits of the space. When the complete rotor is in place in the casing the central member of the piston is prevented from rotating by a feather which, however, permits it to slide back and forth. There are no other parts.

Each cam face has the form that would result if a cylinder were cut through at an acute angle to its axis. Both ends of the piston are of the same form as the cam faces, and its faces fit exactly against the cam faces, when turned into the right position—just as if they were the two parts of the cylinder sawed apart. But while the left hand face of the piston closely fits the cam face in a given position, it must be turned half a revolution before its opposite face will fit the face of the other cam.

Suppose the pump is started when the piston is closed up against one of the side cams. The shaft rotates, but the piston cannot, but is forced to move longitudinally as the high point of the cam swings around. As the space opens, a partial vacuum is of course formed, and as one of the oil inlets is so placed as to open into the space, oil is drawn in. When the shaft has made half a revolution the piston reaches the limit of its motion and suction ceases. At the same time the cam closes the inlet and opens the outlet on the opposite side and the returning piston, as it closes the gap, forces out the oil. But it is the other cam that has pushed the slider back, for exactly the same cycle has been taking place at the other end of the piston, though at alternating periods. The discharge thus is almost constant. The channels A A were cut in the rotor because it was not possible to bring the inlet and outlet openings exactly opposite the openings between the cams. This, however, has no bearing whatever on the principle on which the pump works.

The pump will operate satisfactorily at a speed as low as 9 r. p. m. and is designed for a speed not to exceed 120 r. p. m. It will raise oil through a supply pipe two feet long, first emptying the pipe of air and therefore requiring no priming.

Car Purloined by Courteous Thief.

Generally the man who is the victim of a motor car thief—if he should find his car at all—discovers it in an unfrequented street much the worse for wear, and there seldom is a consoling note in the portion meted out to the outraged motorist. If the story which comes from Youngstown, Ohio, that city of smoke and then more smoke, is authentic, that town has an automobile thief whose sense of the courteous if of a much lighter hue than the once white linen collars of the inhabitants. This automobile highwayman selected an E-M-F "30" for his evening's ride and when found the car bore this note. "This is a —— fine car. Pulled a load of coal out of the mud and would have returned the car if the gasolene had not run out. Many thanks just the same. Good luck." The chirography of the missive and the vaunted accomodation of the driver are clews being followed by the Youngstown police. They are interviewing coal wagon drivers in an effort to get a description of the highwayman.

Side-Play that Causes Motor Knocks.

Occasionally a slight knock in a motor, one that cannot be traced to any looseness in the bearings, is caused by a little too much side-play in a connecting rod, the rod slipping sideways at each stroke. Though this does not ofen occur, it is rather difficult to locate when it does, if unsuspected. The best remedy is a new pair of brasses long enough to take up the play.

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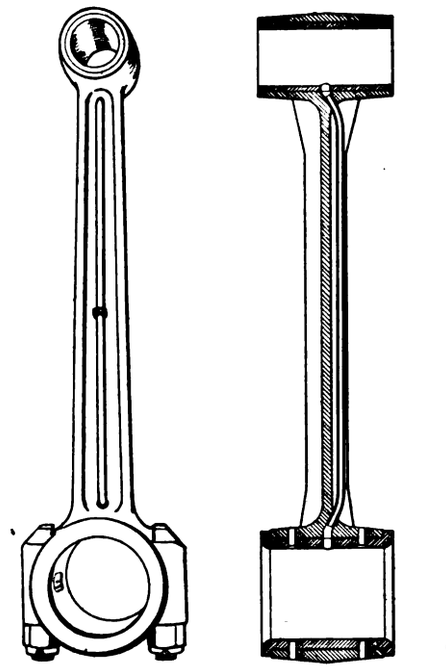
CONNECTING THE PISTON WITH THE CRANKSHAFT

Differing Details in Connecting Rods That Work Unseen—Cross-sectional Forms That Are Light Despite Enormous Strength—Diversified Designs for Pin Bearings and Ingenious Contrivances for Lubricating the Working Parts.

One of the qualifications that stands out prominently in the mental equipment of the designer of successful gasolene motors is the ability to make mechanical compromises—to evolve designs that embody as many as possible of those characteristics which are beneficial to the working of the engine as a whole, with a minimum of disadvantageous features. As a matter of fact, that is where the designer's skill comes into play, for it is not possible to pick out all the good points and discard all the undesirable ones in laying out a motor or any part of a motor; if it were possible, the perfect motor would be a matter of a very short time only. The trouble is that every advantageous feature brings in its train certain things that are more or less undesirable, but which are unavoidable, and though every advance made in the manufacture of high grade steel, every improvement in the forming of true bearing surfaces, means the addition of something on the side of desirability and to the efficiency of the motor as a whole, the designer always will have to exercise a keen appreciation of comparative values in order to have his labors rewarded with success.

Probably there is no one part of the gasolene motor that better illustrates the need for discrimination than the connecting rod—the link between the piston which takes the direct thrust of the expanding gases, and the crankshaft which transmits the internally generated energy to the exterior of the motor, and means by which reciprocating is converted into rotary motion. It is true that during the years that have elapsed since gasolene motors first attained prominence connecting rods, like almost every other component part, have become to a very great extent standardized—that repeated trials, repeated failures and repeated successes have so clearly indicated that certain general forms and proportions are best that there is very little inclination to depart from such forms, except in special cases, where there are specific reasons for so doing. Nevertheless, each engine, differing as it does in some ways from most others, brings its own problems and its own special conditions that must be met, and this accounts for much of the variation that is found in the construction of rods.

As an example of the perplexing combinations of conditions that arise in the process of determining how a connecting rod for a given motor shall be constructed, the question of length is illuminating. The shorter the rod can be made the less will be the total height of the motor, of course, and every inch saved in height means many pounds saved in weight. What more simple, then, than to make the connecting rod so short that it will just clear the lower edge of the piston? Not only will the motor be of minimum height in proportion to its stroke, but the short rod will result in an increased efficiency—theoretically, at least—because the extreme angularity causes a very rapid piston movement during the first part of the expansion stroke, which is conducive to economical power production. Again, a short rod is a strong rod; the shorter it is the lighter it can be made without sacrificing its ability to resist strains, for the cross section can be reduced with the length.



PIERCE-ARROW MARMON

On the other hand, however, an extremely short rod carries with it such an array of objectionable features that its use is practically out of the question. Chief among its disadvantages is that it is a source of vibration that cannot be counterbalanced. The shorter the rod, the greater its maximum angularity with the axis of the cylinder, and the greater and more rapid the acceleration of the piston due to the outward swing of the crank on the down stroke and, contrariwise, the more marked its retardation during the inward swing; in short, the greater the irregularity of piston motion, which sets up unbalanceable vibration—a cardinal failing in the motor of a modern motor car. And the vibration naturally increases the wear and tear on the bearings, to which is added the excessive movement of the piston pin end of the rod. Another question is that of the side thrust on the piston, which, of course, increases with the angularity of the connecting rod.

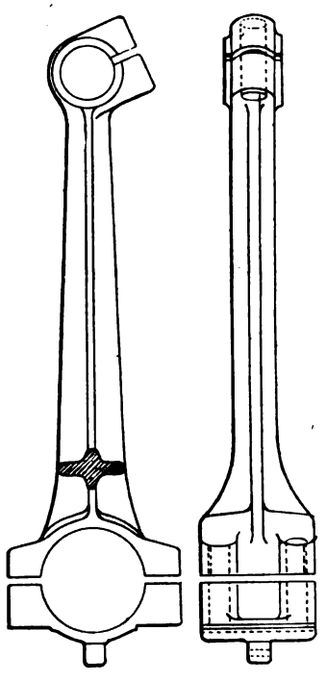
Considering, for example, a piston having a diameter of 4 inches and a connecting rod of a length three times that of the stroke—a rather extreme length, but one which answers well for illustrative purposes. With a maximum pressure of 150 pounds to the square inch on the piston, the side thrust on the cylinder wall will be 243 pounds, or 19.3 pounds per square inch of bearing surface. Shorten the rod to twice the stroke length, however, other conditions remaining the same, and the total pressure increases to 357 pounds, or 28.3 pounds per square inch of bearing surface on the cylinder wall—an increase of 46 per cent., which obviously is of no little moment in view of the necessity for adequate lubrication and the tendency to wear.

At the opposite extreme there are equally discouraging conditions, for though the longer the rod the less the angularity and consequently the less the vibration due to the rod and to irregular piston motion, the engine height increases and weight goes with it; the rod must be made of heavier cross section, and even then in extreme cases will be subject, at high speeds, to a whipping action tending to bend it in the plane of its swing. It can readily be seen, therefore, that the length of a connecting rod is far from being a matter that can be decided offhand. In actual practice it is found that while in a few isolated cases there are rods that are three times the length of the stroke and, at the opposite extreme, there are a few rods that are only 1.75 times the stroke length, the average length is a trifle more than double the stroke length. So much depends upon the character of the motor—its rotative speed, size, ratio of bore to stroke, and so on—that figures can be of interest in a general way only. It does not follow that a connecting rod that is satisfactory in one engine will be satisfactory in another merely because the same general proportions are preserved.

By the process of elimination and the

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survival of the fittest it has come to pass that the cross-sectional form most commonly used in connecting rods is the I-beam or, as it is more properly termed because of the great depth of the flanges, the H-section. In proportion to its weight, a rod of this type is enormously strong, and so well has experience served in the matter of materials and proportions that a broken connecting rod is rare indeed—which is fortunate, in view of the damage that can be wrought by an accident of this character. Connecting rods of H-section are employed in the motors of such well-known cars as the Pierce, Packard, Peerless, Winton, National, Marmon, R. C. H. and numerous others. While this is the rule, there are exceptions, however, and exceptions that are notable because of the names

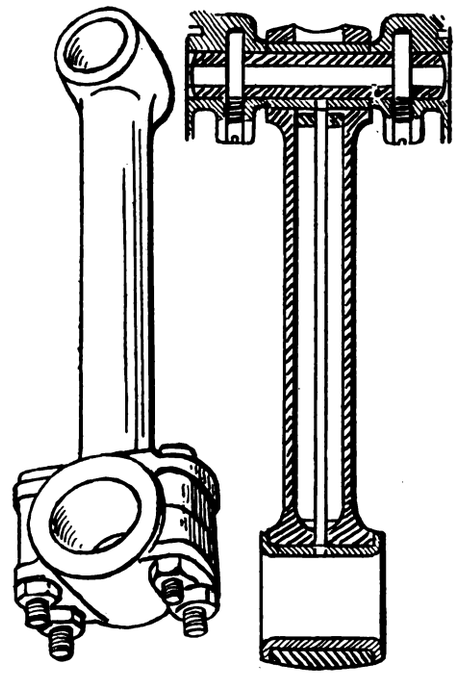


FRANKLIN

and reputations of the machines that choose to depart more or less from the beaten track, with results that seem to thoroughly justify the attitudes of the designers.

In the case of the Franklin car, for instance, the cross-section is cruciform; the intersecting webs are broadened at both crankpin and piston pin ends, so that there are no weak places where the heads join the shank of the rod. The Franklin rod, while differing somewhat from the more usual form, resembles it in that it is made up of comparatively thin webs so disposed that stresses are taken edgewise, there being the greatest thickness of metal disposed in the directions in which stresses are greatest. A totally different design is found in the rod employed in the motor of the Knox car. It is tubular, with comparatively thin walls.

Tubular connecting rods early received the attention of motor designers because of their possibilities in the way of lightness and strength; but as most of the tubular rods constructed were of the three-piece type, having a shank of steel tubing pinned and brazed or otherwise fastened to steel heads, there was more or less trouble from the failure of joints, which clearly have no place in anything subjected to such violent and rapidly alternating stresses as the connecting rod of a gasolene motor, and the possibilities were not realized. The Knox rod, however, is made of a single forging of tough steel. It is forged solid and is carefully and accurately drilled out, the drill starting at the piston pin end and

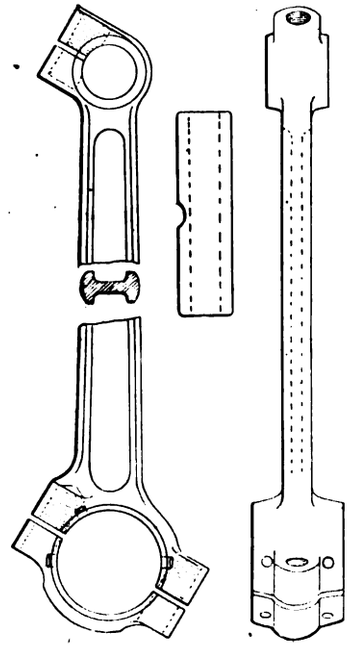


KNOX

passing through the whole shank but stopping short without breaking into the head at the big end. The Knox company states that one of the important advantages of the tubular rod, as made at the Knox factory, is that as it is machined nearly all over, the variation in the weight of rods is very slight—an obvious advantage in the production of a well-balanced, smooth running motor. That the tubular type of rod is very seriously considered by motor designers is not to be denied, and if additional proof were necessary it is to be found in the fact that the designers of the new Atlas-Knight motor have adopted it.

While the permissible choice of cross-sectional forms for connecting rods is quite limited, the choice of materials is even more so, for at the present time practically the only metals used for this purpose are steel and manganese bronze. The advantage of bronze is that it can be formed by the process of casting, and yet the resulting rod will have a strength that will bear comparison with that of steel, though it is customary to make cast bronze rods somewhat heavier than those of forged steel. The bronze used in the manufacture of connecting rods is not possessed of quite the same characteristics as the best bearing bronze, and as a rule bronze rods are fitted with removable bushings of bearing bronze, babbitt or bronze and babbitt; occasionally for the sake of economy in manufacture bronze rods are made without bushings, the bearing being formed directly on the metal of the ends, but for obvious reasons this type of construction is not used to any great extent. However, the manufacture of steel forgings of high grades has become such an enormous industry that the forgings are turned out at prices that really are surprising, considering the excellence of material and workmanship.

While motor manufacturers are almost of one mind in the matter of connecting rod cross-section and material, they do not agree quite so well in some of the details, such, for instance, as the location of the bearing for the piston pin. There are two



WINTON

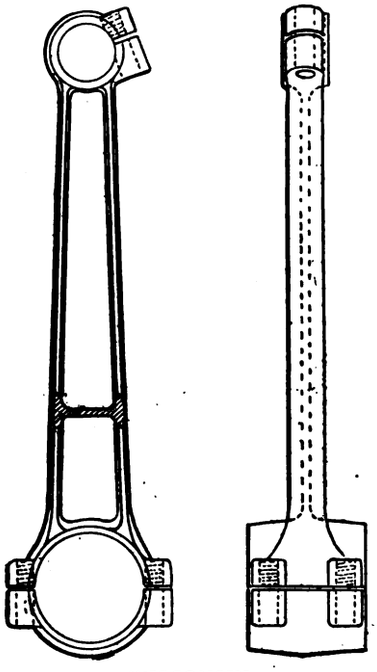
arrangements in use; one is to clamp the pin immovably in the upper end of the connecting rod and provide bearings in the piston bosses, which are bushed for the purpose, and the other is to reverse this procedure, holding the pin fast in the piston bosses and bushing the eye in the rod end for the bearing. Of course, it is desirable to obtain a bearing of the greatest possible area in either case, and for this reason, when the pin is held in the rod, the rod eye is made quite short—just long enough to give the pin a firm anchorage—while the piston bosses are long, their bushings affording the large wearing surface that is desired.

On the other hand, if the bearing is to be in the rod eye, provision is made for a long bushing and the piston bosses are correspondingly short. Where the pin is anchored in the rod, as is done in the Franklin, Winton, R. C. H., the Wisconsin motor and others, the favorite method of securing it is to split the rod end

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by sawing through a lug forged on for the purpose, and clamp the pin by drawing the eye together with a pinching-screw. In order to have something more than friction to prevent the displacing of the pin under strain, the hole for the pinching-screw is drilled so far toward the rod eye that it is necessary to cut a notch in the pin to permit the screw to pass through. This forms an effectual lock. This notched pin arrangement is clearly shown in the illustration of the Winton connecting rod.

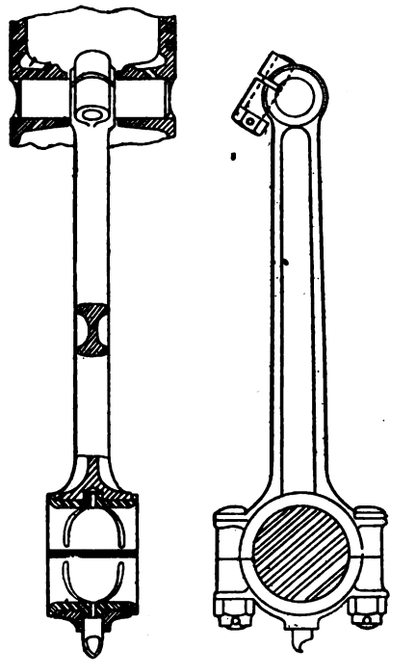
When the pin is anchored in the piston bosses it is fastened by means of screws passing through the bosses and into the pin, or, in some cases, passing clear through the pin and prevented from working out by means of lock nuts, lock washers, split pins or wires passing through holes drilled



WISCONSIN

in the screw heads. In the Marmon, Pierce, National, Peerless, Knox and many other motors, the piston pin takes its bearing in the rod eye and is anchored in the piston bosses. Occasionally as an additional precaution a ring, similar to a piston ring, is placed on the piston, passing over the ends of the piston pin hole, so that if by any chance the pin should get adrift from its set screws or other fastenings it could not work out beyond the surface of the piston and score or cut grooves along the cylinder—an extremely effective way to cause loss of compression, and an expensive damage to repair because it entails the reboring of the cylinder so scored.

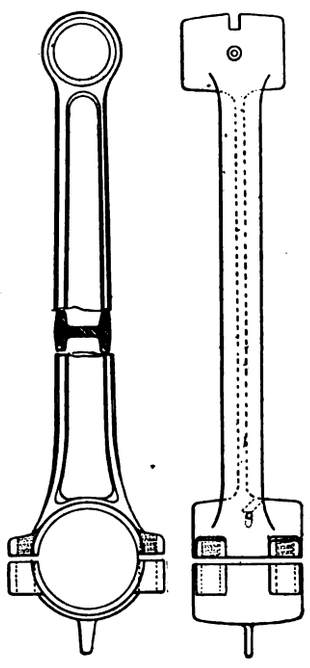
For reasons that are obvious, the crankpin end of the connecting rod has come to be known as the big end, and though the designation is borrowed from marine engine and locomotive nomenclature, it is safe to assume that no other name could be more convenient or appropriate. The construction of the big end, as it is most commonly designed, is adapted from marine engine practice, for the marine type of rod is better adapted to gasolene motor work than the more complex, more expensive and heavier strap-and-key arrangement found in locomotive connecting rods, for instance. In the marine type of connecting rod the bearing is split, horizontally, and is held in place in the rod by a cap bolted on; in small motors it is common practice to use two bolts, and occasionally but two, though of considerable size, are used in fairly large motors. Usually, however, the



R. C. H.

more powerful engines have their connecting rod caps secured by means of four bolts, two on each side, passing through lugs formed integrally with the rod. A connecting rod commonly is forged with the cap integral, and it is afterward sawed off. A practice that is much favored is to machine the rod first and then saw off the cap, the metal removed by the saw being replaced, when the rod is assembled, by thin brass or copper liners or shims. The bushing which forms the bearing surface also is split, of course—otherwise it could not be assembled on the crankpin—and the cap, when bolted in place, holds the two halves of the bushing tightly together. The edges of the bushing are flush with the edges of the cap and of the corresponding part of the rod proper, and the shims, of course, fill the space between the edges of the halves of the bushing, so that a complete circle is formed. Any slight wear in the bushing can be taken up by removing one shim from each side, allowing the bushing to close up and so slightly decrease its diameter when the bolts again are tightened down. If there is any great amount of wear, more shims must be removed, and in such a case the bearing surface of the bushing will need fitting to bring it to the proper shape. It is usual to have the bushing fit closely on the crankpin at top and bottom and part way up and down the sides, but to leave a very slight space between the pin and the bushing just above and below the split. Practically all the wear comes at the top and bottom, so that nothing would be gained by making the bushing a close fit all the way round, whereas the minute space left affords an additional place where a little oil can find lodgment and aid in the perfect lubrication of the surface.

The shims used are made of hard-drawn brass or copper about 1-1,000 of an inch in thickness and are notched to go over the cap bolts, so that they can be withdrawn by loosening but without taking out the bolts. In some cases the cap and bushing are fitted up without shims, and it then



NATIONAL

is necessary to file down the edges of the parts in order to take up wear. This requires considerable mechanical skill and is a practice that has almost entirely given way to the simpler and better arrangement of removable shims.

While the marine type of connecting rod is the standard for motor car work, the hinged type has been used to some extent, though not often seen now. As the illustration shows, the cap is hinged to the rod at one side, while on the other side there are bolts passing through lugs exactly as in the marine type. This makes the adjustment of the rod quite easy as compared with the shimless marine type, but not as easy as the shimmed style; the edges of the bushing only have to be reduced, the cap being separated from the rod end proper by a space large enough so that it cannot be closed up, but the hinge prevents all misplacement of the cap such as might occur in a marine type rod with the cap spaced in the same way if the

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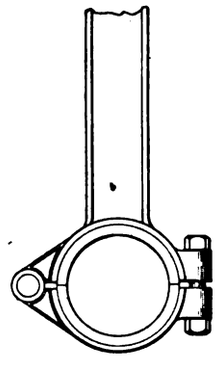
bolts were drawn tighter on one side than on the other.

While most connecting rod big ends are split at right angles to the axis of the rod, there is at least one motor—the Winton—in which the split is made diagonally. This is done with a view to making the bolt heads easy of access when the bearings require adjustment. The big ends come opposite the crankcase openings with the bolt heads in such positions that they can be reached without difficulty with a wrench, which is directly in line with the Winton policy of making every detail of the motor as accessible as possible, a policy which when followed by a manufacturer can do much to popularize his car with owners.

The methods adopted for lubricating the piston pin, or wristpin, and the crankpin, of course, differ according to the ideas of manufacturers in the matter of lubricating systems. For instance, with splash lubrication there may be a little projection on the bottom of the rod which dips into the oil at each revolution and throws it up in a spray, and oil-holes drilled in the upper half of the bearing will carry oil to the bearing surface. The connecting rod of the National motor is a good example of this arrangement. The wristpin gets its oil through a slot cut in the top of the upper end of the rod, admitting the splashed oil to the surface of the pin. The rod used in the R. C. H. motor, on the other hand, has a scoop at the bottom which dips into the oil and forces it up to the crankpin bearing through a suitable oil hole; grooves cut in the bearing distribute the oil over the surface. The scoop, of course, splashes or sprays the oil, which fills the space under the piston, and part of it enters the pockets in the piston bosses above the wristpin and passes down through the holes to the bearing surface of the pin, which in this case is in the piston bosses. Mere holes are not relied upon in the Peerless rod, so far as the big end is concerned. As will be seen by the illustration, the lower end of the shank is surrounded by a metal wall, forming an oil-catching pocket, from which the lubricant flows to the bearing through the usual holes. The piston pin end has two oil holes enlarged or countercourse differ according to the ideas of sunk to facilitate catching oil for the lubrication of the piston pin.

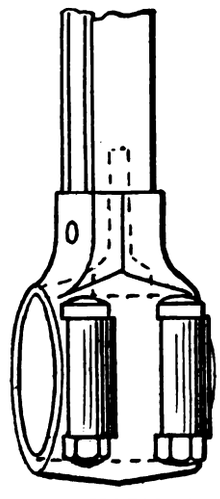
In the case of the Knox connecting rod the lubrication is worked out in an entirely different way. The oil is forced through holes drilled in the crankshaft with outlets at the bearings. Each crankpin outlet is so located as to register, at each revolution, with a hole drilled in the top of the bearing. Oil passes up through this hole and through a tube running up through the hollow rod until it reaches another hole in the bottom of the wristpin bearing. Surplus oil merely works out through the hole in the top of the rod and falls back into the crankcase. This arrangement insures a steady and copious flow of oil, and because there is ample lubrication it is possible to use a hardened steel bushing to form a bearing for the hardened steel pin—a combination that gives exceedingly good results under proper working conditions. The same principle is used in the Marmon rod, though in this case the rod is of H-section and the oil tube runs up one of the channels.

It goes without saying that many other forms of construction have been more or less used in gasolene motor work, all of which may have merit in certain directions, but not enough to bring them into prominence as compared with the designs that



HINGED CAP

have become more or less conventional, so to speak. Occasionally connecting rods are made offset—that is, with their center lines to one side of the axis of the cylinder. This is done where there is lack of space and



PEERLESS

bearings of adequate length could not be accommodated in any other way except by changing the entire design of the engine. Crankshafts have been made of the "built-up" type, with connecting rods solid at both ends, for in such construction the crankpin can be slipped through the big end before the shaft is completely assembled. Ball-and-socket joints have been used instead of the usual piston-pin and cylindrical sleeve design, and with excellent results which, however, were obtained at an expenditure of trouble and money that hardly seemed commensurate with the benefits derived from its use, in the opinion of a majortiy of makers of gasolene motors.

Rate That Heat Raises Pressure.

While there is some danger of subjecting a tire to excessive air pressure if it is inflated fully during a very cool evening and then driven during a hot day—conditions likely to arise only at rare intervals—there is no danger of this kind in ordinary summer weather, as the temperature change required to cause too great a pressure is very considerable. For instance, a tire of average size inflated to 90 pounds' pressure would require a rise in temperature of the inflating air of 60 degrees to increase the pressure to 100 pounds. In case of doubt, however, it always is a simple matter to test the pressure with a tire pressure gauge. A little too much pressure is better than not enough.

When Spare Tire May Cause Trouble.

A point that well may be given some little attention is the danger that sometimes arises of interference between spare tires carried on the running-board and passing vehicles when in close quarters. When the driver is on the right-hand side, which still is the usual position, he can easily see the spare tire or tires and gauge the clearance; but when on the left side, as in many cars now built, it is by no means as easy to estimate the distance there is to spare, and the only thing to do is to be careful—after having made sure that the "spares" do not project any further than is necessary.

What Full Factory Equipment Means.

A striking illustration of the elaborate equipment necessary to maintain a complete stock of motor car parts is contained in the fact that in the tool room of the Pierce-Arrow factory in Buffalo there are no less than 68,000 tools and related appliances, and 23,000 jigs which are used in making parts not only for current models, but for models of past years. The collection of tools and jigs required for making parts for the older types is so complete that almost any part can be supplied, with little or no delay, for Pierce-Arrow cars dating back as far as 1901.

How to Join Lead Materials.

Objects of lead are extremely difficult to solder on account of the low melting point of the metal, and for this reason usually are united by the process of "burning," which is nothing more or less than welding, the adjoining surfaces being heated by means of a blow-torch until they melt and run together. Storage battery straps, the sheet lead lining of tanks and so on are joined by burning.

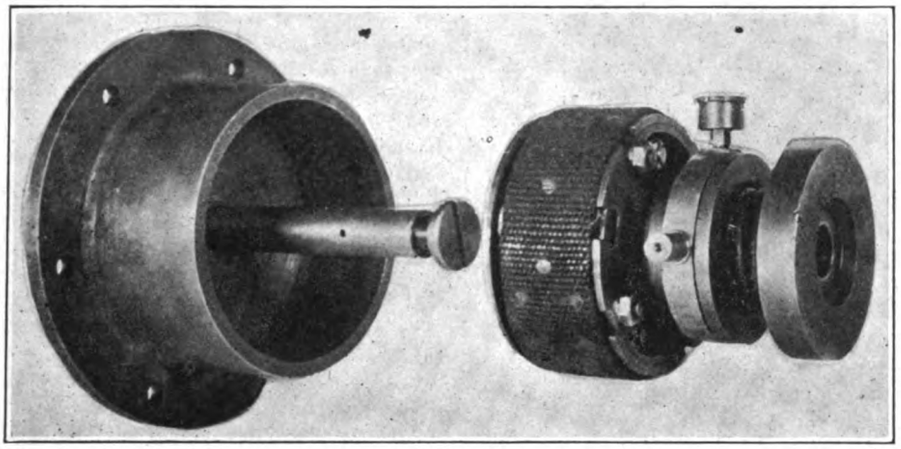
In taking current readings from a generator care must be taken not to remove battery plates from the acid while current is passing, for the sudden removal of the load will cause the motor to race terrifically, and trouble may result.

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KANSAS CONTRIBUTES NEW CLUTCH

Claimed to Eliminate Both "Grabbing" and "Dragging"—Internal Expanding Type and Compact Design.

As a general rule, such clutch troubles as may arise to worry the average individual resolve themselves into two classes, namely, slipping and grabbing. Either trouble scarcely is calculated to engender feelings of friendship for the mechanism, and it was to eliminate both at once that the Central States "gradual" clutch was developed. The clutch is quite new in design and construction and is the product of the Central States Engineering Co., which company was but recently formed in Hutchinson, Kan., to take over and continue the business of the Sellers Automobile Co. Though several other mechanisms not intimately connected with the construction of automobiles will be produced, the principal activities of the company will be directed toward manufacturing its clutches.



CENTRAL STATES "GRADUAL" CLUTCH DISASSEMBLED, SHOWING CONSTRUCTION

Though the compactness of the Central States gradual clutch, which is the name given the mechanism which is manufactured, might lead to the supposition that it is of the multiple disk type, such is not the case, as may be judged by reference to the accompanying illustrations. It is of the internal expanding type and despite its small dimensions is said to approximate clutch perfection more closely than any other device of its kind. It is made in four sizes, the dimensions of the complete clutches and the powers they are designed to transmit being as follows: No. 1, 5 x 7 inches, 20-30 horsepower; No. 2, 6 x 7 inches, 30-40 horsepower; No. 3, 7 x 8 inches, 40-60 horsepower; No. 4, 8 x 9 inches, 60-80 horsepower. Referring to the accompanying illustrations, one of which shows the clutch assembled and the other the two main parts separated in order to make plain the construction, the outer housing is a solid machined casting that serves as the female member of the clutch. The inner member includes the entire mechanism and is held in place by a single screw thus facilitating adjustment and permitting of its easy withdrawal for inspection. The expanding member is lined with a material similar to brake lining though the coefficient of friction and the method of expansion are such that gradual engagement is ensured even though pressure be removed from the clutch pedal abruptly.

This desirable end is attained by expanding the inner Raybestos-lined member over its entire periphery with the aid of four fingers equally spaced. These fingers are forced outward by rollers that move consecutively under the action of a beveled sleeve which moves inward to expand the band and engage the clutch and outward to permit the band to contract and release the clutch. Further, these fingers cause a fiber disk to be brought in contact with the back of the clutch housing. By reason of the unique construction of the device and its positive action it is claimed that release is practically instantaneous and that the drag which is an inherent fault with many other types of clutches is eliminated.

Banker Goes Into Ehle's Inner Casing.

R. V. and J. H. Ehle, who in a small way have been manufacturing, in Council Bluffs, Ia., a puncture-proof inner casing, have interested Ernest E. Hart, president of the First National Bank, of that city, and initial steps have been taken toward the organization of a $50,000 company which will manufacture the Ehle invention on a larger scale. Hart will be president of the company and the Ehles will superintend the production of their inner casing in a plant which, it is stated, will immediately be erected.

To Further Electrics in Chicago.

A Chicago branch of the Electric Vehicle Association of America has been organized in the "windy" city. The officers are: president, George H. Jones; vice-president, G. H. Atkins; secretary-treasurer, J. W. McDowell. The executive committee embraces the officers as well as C. A. Murphy and L. E. Burr.

"MODEL" AND "AS IS" ARE DEFINED

Appending of Annual Designation Not Essential to Description of Type—"As Is" Helps Purchaser Lose Case.

What is the meaning of "as is"? and What constitutes a 1911 model? were two of the interesting questions involved in the suit of Louis N. Hartog against the Broadway Automobile Exchange, Inc., of New York, in which the decision by the lower court was last week affirmed without opinion by the Appellate Division of the New York Supreme Court. The evidence considered was the same which was presented before Chief Justice O'Dwyer in the City Court, which testimony threw sidelights both instructive and otherwise on the second-hand car industry.

Hartog sued for $1,500 for alleged breach of contract. Late in 1910 he purchased from the Broadway Automobile Exchange, of which L. C. Jandorf is the head, what was represented to be a 1911 Model 18 Matheson car, giving in payment for it $900 in cash and an old Packard roadster. Subsequently, when repair parts were required Hartog purchased them from the Matheson Automobile Co., but as they did not fit his car his suspicions were aroused that his purchase was not as represented. Among other things, he testified, the Matheson company told him that his car was a 1910 model and gave him parts which fitted a car produced during that year. He also found that the Matheson which he had purchased did not possess improvements in the hood, the fan belt and pulleys, in the pump shaft, foot brakes, and was lacking in other respects which characterize the 1911 model. Hartog admitted that he had bought the car "as is," following up which he was asked:

Q. Did not the words "as is" imply to you what car was there on the floor? A. It may have implied that, but I did not understand it so. I did not so understand it. I am a manufacturer and am familiar with commercial terms and with the term "as is." The term "as is" means if I purchase a second-hand car and that if the car is broken, or if there are some parts of it gone or if a wheel is off, that I have got to take the car.

Q. It means that you buy the car just as you see it before you, does ot not? A. It means exactly as the car is; however, there are other warranties in that contract.

Q. Go on and answer the question? A. It means that if there are four wheels off the car, you buy it as it is, and you have to take the car.

In reply to other questions, Hartog revealed a buyer's notion of what constitutes a 1911 model.

"I expected to get a 1911 model," he testified. "I understood by a 1911 model that they were delivered by the Matheson people

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in July and I figured that if I bought it in November that the car would not have had a great deal of use and was practically within 20 per cent. of the value of a new car. Yes, I certainly know that the word "model" has something to do with the year it was made in. If it was made in 1900 they would not say that it was a 1911 car."

Daniel Clark McKay, who is described as the superintendent of the Matheson Automobile Company, wrestled with the subject of yearly models in this wise:

By the Court:

Q. When you sell a 1910 car you sell a car that is supposed to have been built prior to June or July, 1910, do you not? A. If they sell a ——

Q. If you sell a 1911 car, you are supposed to sell a car that is built in 1911, are you not? A. A car is manufactured several months before—that is, in advance of the sale of it. For instance, the car that is offered for sale in June, 1910, as a 1911 model, it must have been manufactured several months before that time.

Q. When you sell a 1910 or a 1911 car, what would be the difference between those two cars? A. If we have any change to incorporate in the model we would change it; we did not contemplate any change in the model; we expected to continue that car in exactly the same way.

Q. Why do you sell cars by the year, so to speak; why do you say that a car is a 1910 car and later on why do you say that a car is a 1911 car; what is the distinction between those cars, if any? A. It is a custom of the trade to state that a certain car of a certain year is offered for sale. During the season of 1910, for instance, the car that is offered for sale is a 1910 model, the car you propose to sell in 1911, is taken as a 1911 model, but there is not necessarily any difference in the mechanical features of the car.

Q. Is there any difference in the period of their construction? A. The cars are run in lots, and when one lot is completed the next lot is begun; it would make no difference in the cars, as the cars were not changed; for instance, we have a four cylinder model that has been continued, without change, since 1909, and that Model E car is what we are offering in that line for the season of 1911.

Q. That is irrespective of the time when it was built? A. Yes, sir.

Q. So that if you had a car that was built in 1909, and if you had not made any change in the model, it would be the 1911 car? A. Yes, sir, it is the latest thing we are offering in that line.

William M. Botto, at that time connected with the Abbott-Detroit Motor Car Co. of New York, who acted as broker when the original sale of the car as a new product was made, was one of the witnesses for the defense. After declaring that he was familiar with the 1911 Matheson, he gave the following testimony:

"I mean to say that it is a practice among automobile dealers to give the same kind of a car for a 1910 or a 1911 car. Both are exactly the same: The 1909 and 1910; and the 1911 and 1912. We are selling cars now that are 1912."

Q. Is it not a fact that as early as August and September, October and November and December that automobile manufacturers of standing, sell their cars for the coming year? A. We do not advertise it. It is simply a 1912 Model and we are selling it as 1911 and we know it is a 1912 Model.

Q. There is absolutely no difference between the 1911 car, a 1910 or a 1912 car, is that it? A. Well, a 1910 Model is a difference of a half an inch in size over this year's model. Such make of car is the Regal Car Co. There is no improvement in the make.

Q. What is the difference between a 1907 and 1910 car? A. If a factory builds a good car, they do not change their model; that is so in our business. Factories build cars in numbers and if they find something wrong then they change it, but they do not often change the model.

In charging the jury in the City Court, Justice O'Dwyer said:

"If you find in this case that there was a different model manufactured by the Matheson Co. in November, 1910, than the car in question; that the model was a 1911 model, and that the car in question, was not, then the defendant did not deliver the model of the car which he agreed to. If you find that Mr. McKay has told the truth, and that this was the only model in existence during the year of 1910, then the defendant performed his contract. . . On the other hand, if you determine that the plaintiff did not receive a 1911 model in existence in November, 1910, then he will be entitled to recover damages, and, in case you find in favor of the plaintiff in this case, his damages will be nominal damages only, there being no other proof of the amount of damages that he suffered. So that, if you find that the plaintiff is entitled to recover, your verdict will be in his favor in the sum of six cents. If you find that he is not entitled to recover, your verdict will be in favor of the defendant."

The jury, as stated, promptly found for the defendant and Hartog filed notice of appeal, which appeal last week was denied by the appellate term of the Supreme Court for New York County.

Old Device in New Carburetter.

The weather-beaten proverb which asserts that there is no such thing as a subsolar novelty comes very near to being right, but it should have an amendment tacked on so that it will read "There is nothing new under the sun except the ways in which old things are used"—or words to that effect.

Thus brought up to date, the ancient saying is quite applicable to a new means of assisting carburation which recently has been brought out by the Lattig & Townsend Sales Co., of 1431 Spring Garden street, Philadelphia, Pa., and which is



"GASOMETER" FUEL SAVER

strongly reminiscent of ye olden days of motoring in that it employs a wick through which gasolene vapor is drawn by the motion of the motor. Here the similarity ends, however. The new device, which is called a "carburetter gasometer," consists of a disk of wicking re-enforced by brass wire netting and enclosed in a brass ring. The disk is placed in the intake pipe just above the carburetter, being clamped between the flanges at the point where the carburetter is attached to the intake manifold. All the vapor is, of course, forced to pass through the wicking, and not only is it broken up into exceedingly fine particles, but the wick may be said to act as a sort of balance, absorbing any momentary excess of gasolene and giving out a normal quantity during short periods of excessive leanness of the mixture. Owing to the extreme simplicity of the device, there is not much to be seen, but the accompanying illustration shows what there is.

The manufacturers claim that a very considerable saving in gasolene results from the use of the "gasometer," and, in the light of the remarkable performances of old-time motor cars and motorcycles with wick carburetters, there would appear to be a substantial foundation for the claim, apart from the favorable results of tests of the "gasometer" itself.

Insurance Rates Lowered in St. Louis.

Following a general reduction in the rates charged for liability insurance on automobiles, which went into effect in January last, St. Louis underwriters have made a similar reduction in rates on insurance covering damage done to the property of the public by automobiles. At the time the first cut was made, the automobile damage rate was not altered, and the present reduction is by way of maintaining the former ratio of 25 per cent. between the two. On automobile fire and theft insurance a cut of from 2 to 1.75 per cent. had been made on all electric cars, including pleasure and commercial vehicles. A further reduction to 1.50 per cent. is made, provided the insured agrees to the elimination of the "valued policy" clause. The new rates went into effect June 1st.

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RESULT OF NEGATIVE SALESMANSHIP

Old Commercial Salesman Tells of a Truck He Refused to Sell—Defends Policy Which He Pursues.

"Did you ever hear of a salesman who wouldn't sell a truck if he got a chance?" asked the sales manager as he meditatively read a letter and at the same time tried to keep up conversation with a business friend who was one of the largest truck users the salesman's firm possesses.

"Sure, I have," was the reply, "there are lots of men, I, myself, wouldn't sell goods to—but there's a reason."

"I know what you mean," replied the sales manager, "but I mean a genuine, A No. 1 merchant, who is thoroughly reliable and who has the money to pay spot cash for whatever he buys."

"Well, that's different," was the slow and thoughtful answer. "There might be salesmen who wouldnt't sell a truck in a case like that, but I think that salesman ought to have his cranium X-rayed and his salary docked."

The sales manager's face assumed one of those quiet smiles which were almost a part of his disposition and realizing he had his friend in an embarrassing position suggested: "You may as well get out your X-ray and put it on my head. Also you might go down front to the 'old man' and see if you can get my salary docked. You may not want to believe what I am telling you, but here is something that will prove it."

He rummaged in a stack of letters on his desk and handed one to the business man. It was from a small merchant in a nearby city and was brief but to the point, thinking the sales manager for having told the merchant he ought not to buy one of the firm's trucks.

"Gee!" ejaculated the business man, "supposing the old man knew this. Does he know it?"

"Sure," was the answer, "he told me to do it."

"Told you to do it! Well, that gets me. What's the answer?"

"Very simple. The man didn't need one of our trucks, that's all."

The salesman settled back with his pet theory glowing in his face. "Now, look here," he began, "you fellows on the outside don't know all you might about this commercial car business and a lot of the men who do know a lot about it aren't willing to profit by what they know. But it is only a question of time when they will see the handwriting on the wall. Let me tell you right now that there is one the biggest virgin fields in commercial car selling today that is overlooked by ever so many men who are looking for them. The majority want to sell trucks and some of them don't care to whom or how; which is all wrong.

"There are men who need our trucks and there are men who don't. Take this small business man, for instance. He has a little grocery store that is not so little either and has got the up-to-date idea into his head that a motor vehicle is what he needs. The first thing he did when he had fully made up his mind was to look up one of our dealers, but this dealer didn't happen to have the territory in which the merchant is situated, so the dealer told him what a good truck we had and turned him over to me, for you see it is a sort of open territory. Well, what? The merchant came up here and said he wanted a truck. I asked him what kind of a truck and he said he didn't know. I asked him how much he wanted to pay and he said he was not particular so long as he got all he paid for. Right then and there I could have told him one of our trucks would have been a red-hot proposition for him and could have closed the order and got the money.

"I didn't do it. I asked him about his business and he told me. He runs two delivery wagons and covers a good share of the town. The wagons are drawn by one horse each and besides that there is considerable hauling to be done between the store and the freight houses and the loads are sometimes as large as two tons. The groceryman therefore had an idea he wanted one of our two-ton trucks. He knew it would haul the biggest load he had to draw and so would surely carry the smaller loads. That was as far as his meagre knowledge of things motoring was able to carry him, but he is a man with a reputation for good judgment and when I tried to differ with him he didn't like it at first.

"Then I did what I have done many times before and what I will do many times more before I quit the game. I told him I wouldn't sell him a truck and told him why. What he wants is a small wagon, something much smaller than what we sell. He might get along with a one-ton truck, but a two-ton wagon—no. His horses are now busy nearly all day, but there are times when they are idle, of course. Most of the orders come over the telephone or are taken by boys on bicycles. If he got the two-ton truck I could have sold him it would be too cumbersome for the delivery business in the first place and in the second place would seldom carry a fully load. And every time he went out with the truck only half loaded he would be wasting money for gasolene just to carry the truck's own weight around the streets. It would also cost him more to run it back empty at the end of the route. Also, being heavier, it could not make the speed he would want it to make most of the time and he would probably have more or less of a repair bill, which he would not like. It would end by his being dissatisfied with the truck and letting his dissatisfiaction be known when the truck would not be to blame at all. The only solution of the problem was not to let him have one of our trucks.

"I told him to get a good delivery wagon and what's more I told him which one of our rivals could probably give him the best investment for his money. With one good delivery wagon he can do all of his delivering most of the time and when the wagon has a little bit more than it can do he can easily trot out one of the horses and help out. And, when he has goods to bring from the freight house several loads with the delivery wagon loaded will be better than a lot of delivery trips with the truck only half loaded. The merchant finally saw there was some sense in what I was telling him, but he wasn't quite convinced when he went away there wasn't something back of it he couldn't see. But after he got home and thought it over I guess he saw I talked only for his welfare. That letter there is the answer. Some day I'll want to sell some trucks to some of his friends and if I tell them they need our trucks don't you suppose they'll believe it?

"What this business needs today is men who know when not to sell trucks. This educating the public is one of the greatest things in the world. We've got a bureau here that does nothing but investigate traffic conditions for merchants. Of course you started to buy your trucks of us before we had it going, but as they were what you needed anyway you never saw much of the system. When we find a man who has a considerable horse-drawn delivery and trucking equipment we send one of our bureau men down to see him. It doesn't cost the man a cent. Our man looks over the field, figures length of trips, loads carried, number of wagons in service, the nature of product carried and gets the system right down to rock bottom. Then he tells the man what he needs. He tells him how many cars he needs to do the work, how heavy they should be and if by chance any of them fit the size of car we make, we sell, otherwise we advise him to go elsewhere and get what he really needs. I'll tell you, too, you'd be surprised to learn what it means to us. We have had men send to us from all over the country to have their delivery systems analyzed. They know we will do the square thing. It isn't like an analysis that always comes out 'you need our truck.' There will come a time some day and it's not far away, either, when this factory and a few more like it will be looked upon as white diamonds in a cluster of yellow ones. By the time the rest of them wake up you'll see a rush to our system."

"Isn't it queer I never knew what you were doing for me all this time?" remarked the business man. "Now that I stop to think, you did all those things for me and I never knew it. And now that I look back I can see why I have stuck to your truck when I had other pretty good offers."

"Well," answered the sales manager, as he slapped down his roll-topped desk and made ready to go for lunch, "it looks like a kind of negative salesmanship, but it counts, believe me."

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1,007,874. Tire Protector. David Newton Jones, Gaylord, Minn. Filed Dec. 12, 1910. Serial No. 596,874.

A tire protector comprising a series of metal plates each curved transversely to fit the tire and graduated in thickness from the tread to the sides, square edged flanges on either side of said plate normal thereto, said flanges having straight outer edges flush with the outer surface of the plate at its central portion, perforated ears depending from the sides of the plate and offset outwardly therefrom and flat links hooked in the perforations of the plates to connect the same, said links lying between the ears and the tire.

1,007,878. Guard for Automobile Wheels Nicholas Krell, Barton, Wis. Filed Dec. 29, 1910. Serial No. 599,854.

A guard for automobile wheels comprising an arm having an eye for adjustment to the axle of the machine, a right angular extension forming the lower end of said arm and projected inwardly, a guard plate hingedly attached to the right angular extension of said arm and extended across and in advance of the tire of the wheel of the machine, and a coiled spring encircling said extension one arm of which bears against the arm of the guard thus constructed and having its opposite arm bearing against the under curved surface of the guard plate, whereby the latter is yieldingly held in a position to be moved toward the tire of the wheel of the machine.

1,007,880. Dirigible Headlight. James L. Lowe, Moore, Mont. Filed Nov. 29, 1910. Serial No. 594,625.

1. In a dirigible headlight for vehicles, a lamp supporting frame, means for attaching the latter to a vehicle, a lamp pivotally mounted in the frame, a crank arm secured to said lamp, a vertically disposed crank shaft revolubly mounted on the frame of the vehicle, arms projecting from the upper and lower ends of said shaft, means for connecting the upper arm of the shaft with the crank arm of the lamp, and an operating rod having a universal joint connection at one end with the lower crank arm of the shaft and means to operatively connect the opposite end of said operating rod with the steering shaft of the vehicle.

1,007,890. Transmission Mechanism. Oscar Rash and Franklin Hawes, Oakland, Cal. Filed June 17, 1911. Serial No. 633,673.

1. Transmission mechanism comprising a rotatable disk, having concentric annular racks formed integral therewith, a drive shaft, a gear wheel mounted thereon and adapted to mesh with said racks, a shaft disposed above and to one side of said disk, a spiral sleeve mounted on said shaft, means carried by said sleeve to shift said gear wheel to any one of the racks, means for raising the drive shaft to a desired height, and means for rotating the spiral sleeve to shift said gear.

1,007,901. Pneumatic Spoke Wheel. Arthuer H. Thibault, Seattle, Wash. Filed Jan. 6, 1910. Serial No. 536,719.

1. In a wheel, a rim comprising segmental sections one end of each of which has sliding connection with the adjoining section, a bolt passing through said sections and anti-friction rollers disposed transversely between said sections and bolt.

1,007,959. Speed Changing Mechanism. Arthur R. McCausland, Washington, Pa. Filed May 19, 1909. Serial No. 497,115.

1. In speed changing mechanism a reciprocating driving member, two connecting rods connected thereto, two shafts driven respectively by said rods, a driven wheel loosely journaled on one of said shafts, a wheel loosely journaled on the other of said shafts, a connection between said wheels for driving said driven wheel from the other wheel when desired, and clutching means adapted to fix each of said wheels to its shaft respectively.

1,007,993. Resilient Wheel. Arthur Darby Wack, St. Louis, Mo. Filed Sept. 12, 1910. Serial No. 581,511.

A wheel comprising spaced spoke sections provided at their adjacent ends with transverse heads extended upon each side of the sections, in the plane of the wheel; bowed springs resting against the heads; and securing devices extended through the springs and through the heads, upon both sides of the sections, in the plane of the wheel; the sections and the heads being united by spaced flanges, extended parallel to the plane of the wheel, between which flanges the securing devices are located; the heads having spaced fingers, engaging the sides only, of the springs, the springs being exposed, throughout their entire transverse extent between the fingers.

1,008,051. Tire. Ransom E. Olds, Lansing, Mich. Filed June 11, 1910. Serial No. 566,332.

In a wheel tire, the combination of a grooved rim, a plurality of centrally perforated plane disks of resilient material arranged in spaced relation from one another in said grooved rim, a holding band passing through each disk in a line substantially parallel with the grooved face of the rim, whereby the several disks are held firmly thereagainst and are maintained in their spaced relation to one another, and armor pieces engaging over the exposed outer portion of each disk, the end portions of each piece being bent over portions of the plane faces of the disk and anchored in the perforated portion thereof, substantially as described.

1,008,059. Igniting of the Charges in Internal Combustion Engines. Robert Edward Phillips, Gerrards Cross, England. Filed Dec. 17, 1910. Serial No. 597,936.

The combination, with a cylinder, a piston, and a combustion chamber in the head of the cylinder, of a centrally arranged firing chamber integral with the cylinder head, a sparking device located in the said firing chamber, inlet and exhaust ports opening direct into the combustion chamber, a plurality of axially arranged ports putting the firing chamber into communication with the combustion chamber, the orifices of said ports within the combustion chamber being equidistant from the terminals of the operative part of the sparking device.

1,008,110. Resilient Tire. Charles W Blake, Delaware City, Del. Filed June 25, 1910. Serial No. 568,901.

1. The combination, with a felly of a wheel and tire, of shoes on the inner surface of the tire, other shoes on the outer surface of the felly, tables on the facing surfaces of said inner and outer shoes, said tables having concentric circular steps thereon, helical springs interposed between said shoes and engaging the steps on said tables, bumpers arranged concentrically of the steps of said tables farthest from their respective shoes said bumpers being made of resilient material and extending within said springs where they are adapted to be brought together when said springs are compressed.

1,008,111. Resilient Tire. Charles W. Blake, Delaware City, Del. Filed Oct. 11, 1910. Serial No. 586,533.

1. The combination, with a felly of a wheel, and a tire, of shoes arranged on the inner surface of said tire, elastic cushioning devices arranged between said shoes, and the felly, each of said shoes having a longitudinally extending socket opening at one end thereof, a lug arranged on the other end of each shoe and projecting into the open end of the socket in the adjacent shoe, and elastic cushioning means arranged in said sockets and engaging said lugs for normally holding said shoes at a uniform distance apart.

1,008,116. Vehicle Wheel and Tire. Melville Clark, Chicago, Ill. Filed Aug. 28, 1909. Serial No. 515,042.

1. A vehicle wheel comprising in combination with the felly, guard plates secured thereto and forming between them a seat for a yielding tire, a tire lodged in such seat comprising a tread element or member of yielding material for cushioning and an inflatable tube interposed in the seat between the same and the tread element, the guard plates having inwardly opening recesses and the tread member having laterally projecting annular flanges entering said recesses less in dimension radial with respect to the wheel than the recesses, said flanges having radially elongated pockets at intervals in the circumference of the wheel extending in depth farther than the laterally extending dimension of the flanges, and rigid studs projecting from the bottom of the recesses into said pockets, spaced radially with respect to the wheel inward from the outer ends of the pockets.

1,008,178. Igniter for Internal Combustion Engines. Carl Messerschmid, New York, N. Y., assignor to The Duplex Magneto and Spark Plug Company, Brooklyn, N. Y. Filed Jan. 6, 1911. Serial No. 601,074.

1. In a duplex igniter for internal combustion engines, the combination of a hollow bushing, a low tension electrode carried by said bushing, and a high tension electrode supported by said low tension electrode and insulated therefrom.

1,008,224. Resilient Metallic Vehicle Wheel. William Henry Wales, Jr., Norfolk, Va. Filed Oct. 15, 1908. Serial No. 457,829.

1. In a vehicle wheel, a rim, a primary ring secured to the rim and provided with side flanges each having spaced lugs, a supplementary ring of greater diameter than the primary ring and provided with side flanges, each having spaced lugs, a set of spacing plates on each ring, the plates of one set having a tongue and groove connection and the plates of the other set being disconnected and having rounded ends, and springs interposed between the spacing plates.

1,008,287. Acetylene Gas Lighter. Henry van Hoevenberg, Lake Placid Club, N. Y. Filed Mar. 22, 1910. Serial No. 550,849.

1. A device of the character described, comprising a pair of contact members adapted to move in opposite directions and also to engage and disengage each other, mechanism for completing an electric circuit between said contact members as the same are moved relatively to each other in one direction, and means controllable by movements of one of said contact members for maintaining said electric circuit open

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when said members move in the opposite direction relatively to each other.

1,008,373. Running Gear for Vehicles. Arthur R. Selden, Rochester, N. Y., assignor of one-fifth to William D. Ellwanger, Rochester, N. Y. Filed Feb. 10, 1908. Serial No. 415,156.

1. A running gear having, in combination, two vertical, substantially triangular frame members connected by a vertical pivot, two substantially horizontal frames connected with the vertical frames respectively, one of the horizontal frames being connected with the corresponding vertical frame by a longitudinal horizontal pivot, means for turning the frames relatively about the vertical pivot, and a pair of wheels supporting each horizontal frame.

1,008,375. Spring Wheel. George A. Siders and Samuel E. Siders, Delphos, Kan. Filed Dec. 28, 1910. Serial No. 599,661.

A spring wheel comprising a hub and a rim, a felly separated from the rim, leaf springs carried by the felly, bolts connecting the leaf springs and rim, springs surrounding said bolts between the leaf springs and the rim, and a pair of springs arranged diagonally across the space between the rim and felly and in opposition to each other, said springs connecting the rim and felly, together with a dust shield carried by the felly and free of the rim.

1,008,428. Friction Clutch. Charles M. L. Moseson, Fitchburg, Mass. Filed Mar. 23, 1910. Serial No. 551,223.

1. A friction clutch, comprising an interior member having peripheral recesses for rolling bodies, said recesses having cam surfaces, an exterior member having an annular internal groove, a series of rolling bodies held between said recesses and said groove, said exterior member divided to form a removable ring containing part of said internal groove.



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BROKEN CRANKSHAFTS, cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

ARE YOU in need of any additional help in any department of your business? Are you out of employment or looking for a better connection? Have you second-hand apparatus of any kind or do you want to buy second-hand material? Have you a factory site for sale or do you want to buy one? If so, use the Want and For Sale column of the Motor World. Seven words to the line, fifteen cents a line. Advertisements can be inserted over a number when it is desired and identity of the advertiser will be kept confidential.

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Send Us Your Inquiries
When in the Market for

Sheet Metal Stampings

Estimates Cheerfully Furnished

The Bossert Company
UTICA, N. Y.

BEST BY TEST

We will prove to you by actual test, against any fan you may now be using, that the

Sparks - Withington
ONE-PIECE BLADE
Radiator Fan

will deliver the greatest quantity of air at the least horsepower. Don't contract for 1913 until you get our proposition.

THE SPARKS-WITHINGTON CO., Jackson, Mich.

Save Those Tires You can make your tires wear years instead of months—no tire troubles—no repair expenses—no delays. Free Book on request tells how you can get full motoring pleasure with

STANDARD TIRE PROTECTORS



Saving 90% of motor car up-keep costs. Dealers: 20% lower prices this year—and bigger discounts to you. Prepare to fill rush of orders.
STANDARD TIRE PROTECTOR CO.
649 E. Market St., Akron, Ohio

MOTOR WORLD

"The paper that is read—not merely looked at"—furnishes the strongest dollar-for-dollar advertising value ever offered to manufacturers of

Automobiles, Parts, Appliances.

Every manufacturer who is looking for more and better trade outlets will find the investigation of this proposition interesting from a profit bearing standpoint.

THE MOTOR WORLD PUBLISHING CO.
1600 Broadway, New York

Best—Because Surest and Easiest

The inner tube can be perfectly repaired in 15 minutes by



Patent Pending Nickel Plated

The Imperial Vulcanizer Repair Kit

with only one ounce of gasoline and a little prepared rubber.

Price $3.50 Complete
At your dealers, or sent by express.
Guaranteed to Satisfy
Address Dept. E.

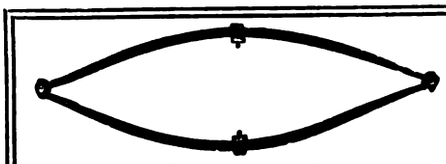
THE McGRAW TIRE & RUBBER CO.
East Palestine, Ohio

Mosler **Spit-Fire** Are The Best

GEARS
TRANSMISSION, TIMING, BEVELS, HELICALS, WORM
Every gear has a guarantee.
GRANT LEES MACHINE CO.
CLEVELAND



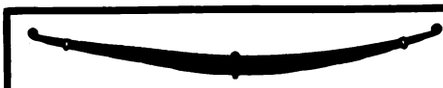
Magneto Plugs coax maximum power out of engine.
EMIL GROSSMAN COMPANY, Mfr., New York and Detroit



Guaranteed Automobile Springs

Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.

PENN SPRING WORKS
Baldwinsville, N. Y.



Perfection Spring Company
SPECIALISTS IN
Spring Suspension
High Grade Only
Cleveland, Ohio



Push Over Valve
Press the Lever and It's Tight
Simple, Isn't It?

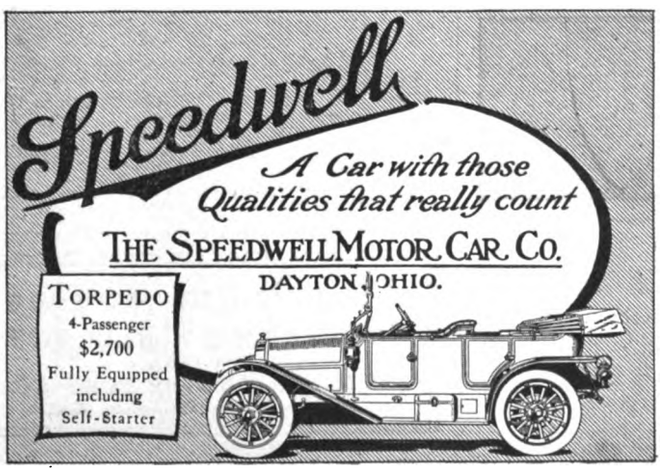
Grab Pump Connection

25c. at All Dealers or
MOTOR CAR EQUIPMENT Co.
55 Warren Street Dept. W New York City

GOOD YEAR

This Name on Automobile Tires and Rubber Accessories Signifies Inherent Qualities of Material and Workmanship that Insure the Maximum of Service at the Minimum of Expense. (3407)
The Goodyear Tire and Rubber Co., Arthur St., Akron, O.

Speedwell
A Car with those Qualities that really count
THE SPEEDWELL MOTOR CAR CO.
DAYTON, OHIO.



TORPEDO
4-Passenger
$2,700
Fully Equipped including Self-Starter

IF YOU ARE INTERESTED IN
MOTORCYCLES
THE BICYCLING WORLD AND MOTORCYCLE REVIEW
WILL INTEREST YOU
PUBLISHED EVERY SATURDAY AT
1600 BROADWAY, NEW YORK
$2.00 Per Year *Specimen Copies Gratis*

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Weed Chains

The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you cannot prevent skidding or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with Weed Chains.

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them on the front wheels too.

For your own safety—for the safety of the public, fully equip your car with Weed Chains. Make it your business to get a set today.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
28 Moore St. New York

The Name "Weed" on Every Hook

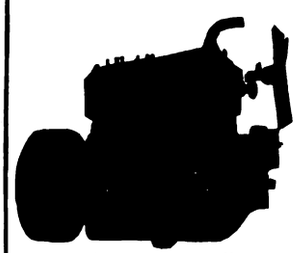
Jencick Motors

OF QUALITY

For Motor Trucks

Jencick Motor Corporation
PORTCHESTER, N. Y.

"CONTINENTAL"



Continental Model "C"

Best known motor in America. Look for the name "Continental" on the crank case. We have looked after the quality behind it.

4 and 6 Cylinders 20 to 60 H. P.

Write for Booklets

CONTINENTAL MOTOR MFG. COMPANY
Muskegon, Mich.

FACTORY REPRESENTATIVES;
K. F. Peterson, . 122 S. Michigan Blvd., Chicago
L. D. Bolton, ... 1810 Ford Bldg., Detroit

All Standard Bearings are fully described in our **New Catalog 24 A**
Send for it.
Standard Roller Bearing Company
PHILADELPHIA

TRUFFAULT-HARTFORD Shock Absorber
HARTFORD SUSPENSION COMPANY, 104 Bay St., Jersey City, N. J.
EDW. V. HARTFORD, Pres.
New York, 212-214 W. 88th St.; Boston, 319 Columbus Ave.; Chicago, 1458 Michigan Ave.; Philadelphia, 250 North Broad St.; Detroit, 870 Woodward Ave.

LBA STORAGE BATTERIES
Class A for Electric Lighting
Class B for Electric Starting
Manufactured by
Willard Storage Battery Company
CLEVELAND, OHIO

INVADER OIL
"The Best the World Affords"
CHAS. F. KELLOM & CO.
Philadelphia Boston

$495.00 METZ 22 H. P. MOTOR CAR

The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.

METZ COMPANY, Waltham, Mass., U.S.A.

We Specialize on
Finishing Crank Shafts
Only.
MICHIGAN CRANK SHAFT CO.
Lansing

Auto-Top Fabrics
OF EVERY DESCRIPTION
SAMPLES AND PRICES ON REQUEST
L. J. MUTTY CO., Boston

MOTZ Cushion Tires
For Pleasure Cars and Light Delivery Cars
Send for Booklet 58
THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio
BRANCHES:
1727 Broadway, New York 900 Woodward Ave., Detroit
2022 Michigan Ave., Chicago 600 E. 18th St., Kansas City
2262 Euclid Ave., Cleveland
Standard Tire & Rubber Co., 104-106 Portland St., Boston
Distributors for New England States

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

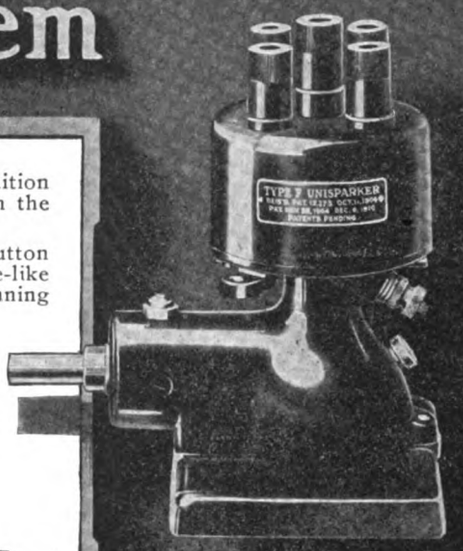
Woodworth Treads
will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
LEATHER TIRE GOODS CO., Niagara Falls, N. Y.

Locomobile Cars for 1912
Complete information furnished on request.
The Locomobile Company
BRIDGEPORT, CONN.

Aluminum Bodies
THE SPRINGFIELD TOP
(Pat. 1895)
SPRINGFIELD METAL BODY CO.
366 Birnie Avenue, Springfield, Mass.

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The Atwater Kent Ignition System



ANY CAR equipped with a self-starter requires an ignition system capable of producing a hot starting spark with the engine at a standstill.

Instead of a thin stream of weak sparks, the starting button of the Atwater Kent System produces a single heavy flame-like spark from three to five times hotter than the normal running spark. It will ignite any mixture that will burn.

This is but one of many excellent features of an ignition system that combines all of the advantages of both magneto and battery ignition—a simple device with but three moving parts, one contact, one adjustment—one non-vibrating coil—a system ideal in its efficiency, simplicity and reliability.

Write today for illustrated booklet "D" full of interesting ignition information.

Atwater Kent Mfg. Works,
46 N. Sixth Street, Philadelphia, Pa.

The best auto horn —and the best advertised

Showing our advertising reduced) in the Saturday Evening Post, starting June 1st.



The trade has called the **Waymaker** "the best designed auto horn," "the horn that combines all the advantages of exhaust and electric horns," "the horn that sells easiest and stays sold."

The trade has backed its praise with its orders and repeat orders—till the business to date is double our expectations.

Now we are expanding our advertising in a way that should win the co-operation of the most sceptical dealer. *The Saturday Evening Post* advertising—of which we show a reduced cut herewith—will reach **two million circulation each issue, or ten million readers** (at the accepted average of 5 readers per copy). And the *Post* advertising won't stop with June.

In addition, *Cosmopolitan, McClure's, The Literary Digest, Life, Review of Reviews, American Motorist, Motor Car, Motor Print, Auto Trade Journal, Motor, Horseless Age,* etc., will bring the **Waymaker Horn** advertising prominently before **another two million or more circulation** (or **ten million readers,** if you want the complete figures).

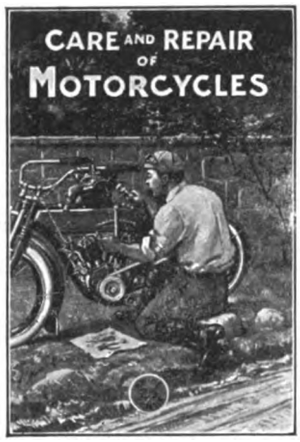
Never before has such a horn been so well advertised—reaching practically every car owner and his friends and family.

Do you want these orders?

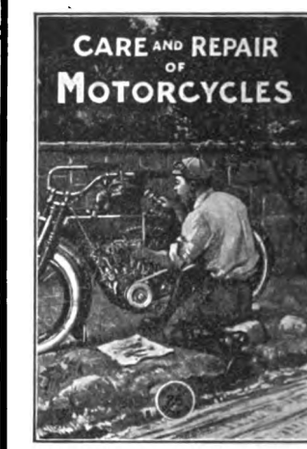
Stock up at once on the **Waymaker Horn.** Write today for our trade proposition, our descriptive booklet V, and the **Waymaker Data Book,** showing how our simple coupling system enables you to fit any car from a minimum stock of coupling.

Lee Tire & Rubber Co., Conshohocken, Pa.
J. Ellwood Lee, Pres.

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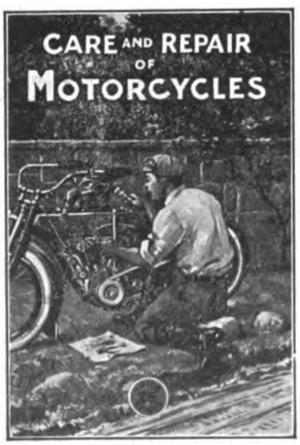
A trouble saver for the motorcyclists



This book contains more practical advice for the rider, more good hard sense, more suggestions as to how to keep out of trouble, and how to get out of it, than has ever been printed heretofore in any one book.

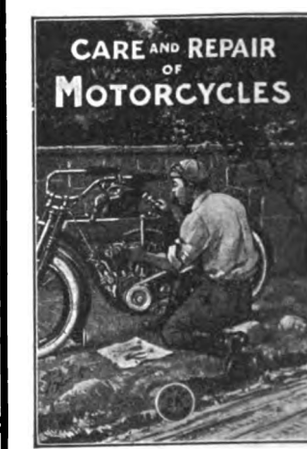
¶ It fits the coat pocket and it includes free engine clutches, two-speed gears, mechanical lubricators and magnetos, together with special matter on motors, valves, carbureters, fuel and important general subjects, all plentifully illustrated.

¶ Dealers and jobbers in all parts of the country are selling "Care and Repair of Motorcycles" to both new riders and veterans as the best aid in correcting and avoiding motorcycle trouble.



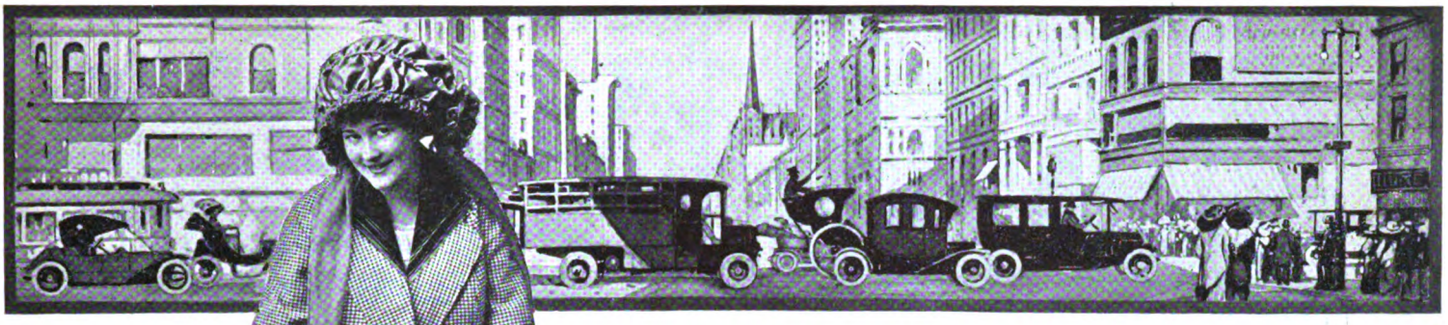
Sent Postpaid on Receipt of 25 Cents

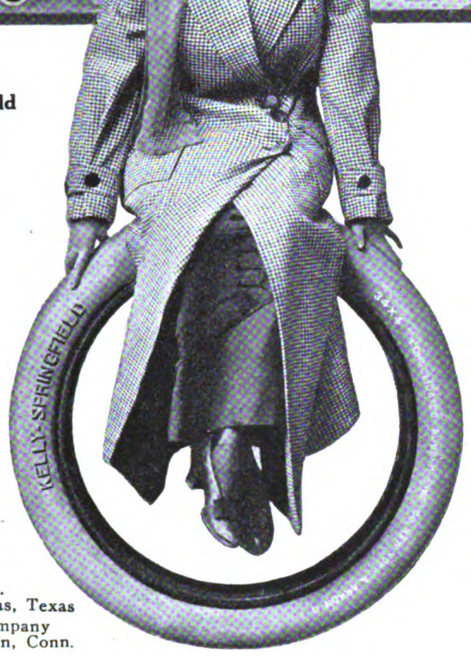
Special Rates to Jobbers and Dealers on Quantity Orders.



BICYCLING WORLD COMPANY
1600 Broadway **New York**

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Kelly-Springfield Tire Company
20 Vesey St., New York

Branch Offices in
New York
Chicago
Philadelphia
Boston
St. Louis
Detroit
Cincinnati
San Francisco
Los Angeles
Cleveland
Baltimore
Washington
Seattle
Atlanta
Akron, O.
Buffalo

Boss Rubber Co.
Denver, Colo.

Appel & Burwell
Rubber & Tire Co.
Dallas, Texas

Todd Rubber Company
New Haven, Conn.

Second hand experience is just as efficient and infinitely cheaper than first hand.

Take your tire experience from what others have learned at great expense on other tires, and get your tuition free. Get the **best** tires **first** by getting

Kelly-Springfield Automobile Tires

The name "Kelly-Springfield" on a tire stands for the same quality of rubber compound, the same tire-making experience, and the same care in manufacture, that have, for sixteen years, made the Kelly-Springfield solid vehicle tire the best of its kind.

Kelly-Springfield Tire Company, New York and Akron, Ohio

FEDDERS

AUTOMOBILE RADIATORS

All Sides Surrounded by Water



REAL square tube radiators—such as the Fedders—do not clog up and lose their efficiency after a few months of use.

The water channels are both vertical and horizontal. This not only helps to obviate the danger of clogged tubes but insures the maximum cooling surface as well.

Real square tube radiators are easily repaired in the event of an accident whereas most other types call for a return to the factory or an unsatisfactory job. A pair of tinner's irons is all that is needed to repair a square tube rediator.

Fedders Manufacturing Works
BUFFALO, NEW YORK

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A TWITCHELL AIR GAUGE at $1.00



Statistics show that 26 per cent. of all tire trouble is caused by improper inflation.

Statistics show that you can take one thousand miles of service out of a set of tires by driving them partially inflated over ten miles of road. This means you can only get Big Mileage out of tires inflated to the right pressure.

The Twitchell Air Gauge

tells you in a minute if your tires are properly inflated. That is why the TWITCHELL AIR GAUGE is tire insurance; that is why it is a guarantee of maximum tire efficiency.

You simply apply the gauge to your valve and the indicator shows your tire pressure. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.

Price $1.00 Each

Now Ready for Shipment
Can Be Obtained From Your Dealer

Twitchell Gauge Mfg. Co.

1256 South Michigan Avenue
CHICAGO, ILL.

or A NEW SET of TIRES at



Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

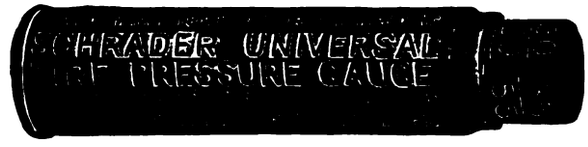
He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

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No More Death-Dealing Tire Explosions Like This



No car on inflated tires is ever safe enough for you to trust with the lives of your family. Tire explosions—hurling cars off the roadway, landing them upside down on top of the crushed passengers, or over embankments or against rocks, telegraph poles or curbstones—are daily recorded in the roll of disasters due to the use of pneumatics.

Can you afford to use pneumatics on your car—inviting injury and death on every ride? You need not—for now science has done away with every excuse for using pneumatic tires.

The Dayton Airless Tire

The final triumph in tire making—buoyant resiliency and perfect riding ease without air! Soft inner column-like piers of elastic rubber, support the Dayton Airless Tire and make any kind of tire trouble an absolute impossibility. This actually trouble-proof tire **cannot** explode—for it contains no compressed air. The supporting rubber columns alternate with free air spaces—and when an obstruction is encountered these columns easily and gently "give," expanding into the open spaces on each side. As the obstruction is passed over, the columns recover to normal position without that air-rebound characteristic of pneumatics. Perfect resiliency and comfort, with absolute safety and freedom from any and every form of tire trouble—all that is yours when your car is equipped with Dayton Airless Tires.



Write today for the Free Book—"The Air-Free—Care-Free Tire." It answers every question you would ask.

Get The Dayton Airless Agency

Dayton Airless Tires must supercede every other tire. The exclusive Dayton Airless Tire local agency will do the best and biggest tire business in your city. Men of first-rate qualifications and responsibility are invited to take quick action on this proposition. Telegraph us, then write fully

THE DAYTON RUBBER MANUFACTURING COMPANY

105 Kiser Street **Dayton, Ohio**

C. J. CROSS & CO., Eastern Agents, 1878 Broadway New York City.

CHAS. P. JAEGER, Chicago Representative, 2123 Michigan Avenue, Chicago, Ill.

THE DAYTON AUTO EQUIPMENT CO., Central Ohio Representatives, 5 East Second Street, Dayton, O.

J. L. DULIN, Indianapolis Representative, 404 N. Capital Ave., Indianapolis, Ind.

E. LINGE, Kansas Representative, 123 West 5th Street, Topeka, Kan.

MERIDIAN SALES CO., Maryland, Virginia and District of Columbia Reps., 729 15th St., Washington, D. C.

L. P. HORNBERGER, Pacific Coast Representative, Alaska Bldg., Seattle, Washington.

COX & SORENSON, Oregon Representatives, 719 Chamber of Commerce Bldg., Portland, Ore.

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is based on the fact that we have been handling the engraving of several prominent trade and general publications for years to the utmost satisfaction of both publishers and advertisers

CUTS USED IN THIS PUBLICATION ARE MADE by the

MOSS PHOTO ENGRAVING CO.

PUCK BUILDING

295-309 LAFAYETTE ST. cor. HOUSTON

NEW YORK

TELEPHONE 81 SPRING

ESTABLISHED 1871

SERVICE

The quality of work turned out by this plant is re-inforced by our facilities for deliveries as promised. Your work will be put through with the same care and dispatch given to publishers whose work must be right—and "right on the dot."

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The New Type of Electric

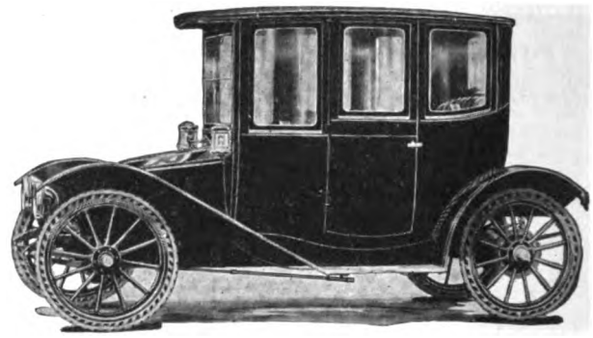
The Argo is setting new standards for builders of electric motor cars. Long and sweeping in lines—beautiful in finish—with luxury apparent in every detail, it attracts instant attention wherever it goes.

The Argo is different from the old style models—the body is not perched upon the chassis—it it swung low between the axles, with only 5 inches from curb to step. This low-hung construction gives not only the fine French lines, but low center of gravity. Swaying is impossible—skidding is reduced to a minimum—it is a radical departure from the old type of top-heavy, awkward, electric car.

ARGO ELECTRICS

The wheel steer of the Argo is handier—the only safe and sure steering method for rough and slippery roads—the silent, chainless, geared drive is more efficient—the long wheel base, large wheels and improved springs makes it ride easier than any other electric built.

AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both



ARGO ELECTRIC VEHICLE CO.

1201 S. Jefferson Avenue SAGINAW, MICH.

Chicago Salesrooms—2412 Michigan Avenue

Great Northern Hotel

CHICAGO

Ideal Headquarters for Automobilists

Rates:

Without Private Bath
$1.50 and $2.00

With Bath
$2.50 to $4.00



Large, Comfortable Rooms

Grill Room Popular Prices

Cafe on Parlor Floor

Service and Appointments Most Approved

Most centrally located hotel in Chicago and absolutely of fireproof construction.

Jackson Blvd., Dearborn and Quincy Sts.

JOHN C. ROTH, Managing Director

Self Hanna Starter

Watch the Prices Drop!

Just as the Hanna self starter—the only 100% efficient self starter that does not foul or soot your plugs—was imitated by those who followed our lead so now is the price of the Valentine manifold starter being met.

Remember We Were the Originators

Not only were we the first to produce an acetylene self starter but we were first to introduce a manifold self starter at the right price, $10.

Our Price Does Not Cut the Dealer's Profit

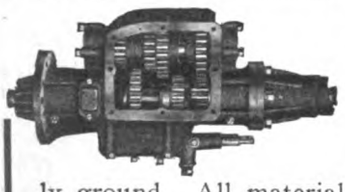
Still some fine territory open. The profit is big. Our goods are right and fully guaranteed. Write today.

J. H. VALENTINE COMPANY

Syracuse, New York

The Valentine Manifold Starter and Gas Lighter

COVERT Transmissions



will help bring your car to the standard of efficiency that you are working for. Every gear shaft and bearing is made of nickel steel, heat treated and accurately ground. All material and workmanship is guaranteed. Will be glad to talk with you about them.

COVERT MOTOR VEHICLE CO.

Sales Office: Ford Building, Detroit, Mich.
Factory: Lockport, N. Y.

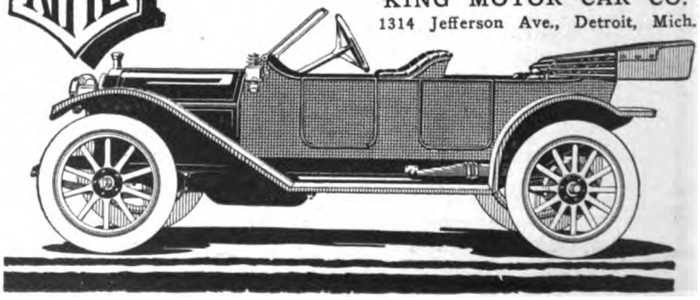
KING

By eliminating over a thousand useless parts, we have eliminated over a thousand worries and troubles that owners of other cars experience.

With full equipment, including self-starter $1565

Terms, territory and detailed description on request.

KING MOTOR CAR CO.
1314 Jefferson Ave., Detroit, Mich.



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Drop Hammer Forgings

cost very little more than castings. They are vastly superior and less expensive in the end.

We Are Specialists

in producing

Drop Hammer Forgings

from special analysis steel.

Send prints of parts you will need in

1913.

QUALITY AND SERVICE GUARANTEED

THE CONSOLIDATED MFG. COMPANY

Toledo, Ohio

AJAX TIRES

(Guaranteed 5000 Miles)

Set a New Standard in Tire Values

Run an Ajax with any other tire. See how much tougher and stronger it is—how it outlasts the other.

The remarkable performance of Ajax Tires in road tests has marked a revolution in tire making.

Get FULL SERVICE out of every one of your tires. It is mileage that counts!

The Ajax is a real anti-skid tire. There can be no side slip.

Dealers' Opportunities

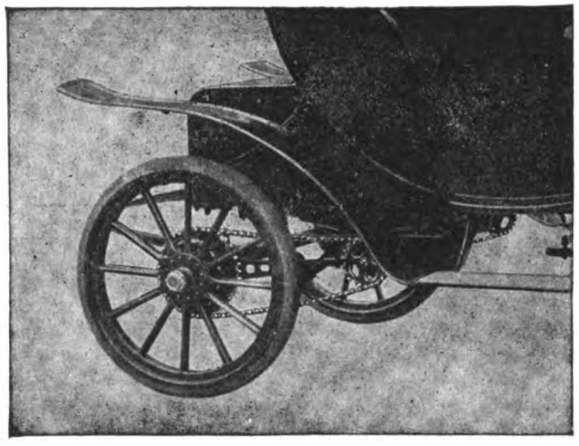
Wherever there are automobiles there is a demand for Ajax Tires. We are advertising in trade papers throughout the country. Why not benefit by this? Let us explain our special proposition.

AJAX-GRIEB RUBBER CO.

General Offices: 1796 Broadway, New York City

Factories: Trenton, N. J.

Branches in Principal Cities



Diamond Chains used here for six years—perfectly satisfactory



That's the record Diamond Chains have made for themselves on Woods Electric Vehicles, the drive of which is shown above.

Double Diamond Chains as used on Woods Electrics permit of the simplest form of fixed or dead axle, as strong and trustworthy as an ordinary wagon axle—no gears or revolving parts that depend upon the cushioning effect of tires. It is evident that double chain drives and a solid rear axle can be much lighter for the same carrying capacity than a shaft drive axle which must also support the differential and its case. Hence such structural shapes as represent economy in weight can be adopted with the side chain drive.

The stability of a solid axle and chains is also much greater than that of a shaft-driven axle. A slight bend in the axle of a chain-driven car is less serious in causing power waste and wear, while on a shaft-driven car the power is often influenced enough by a sagging axle to alter the speed and mileage and render the car unsatisfactory. You have the proof of this in the use of truss rods on many shaft-driven axles to support the differential.

Double Diamond Chain Drives give greater road clearance to vital parts, a better weight distribution, longer tire life, quiet running where sprockets are cut right, and the efficiency remains higher for a longer time. It will pay you well to ivestigate these features of chain-driving in general and Diamond Chains in particular.

TRADE ◇ MARK

DIAMOND CHAIN & MFG. CO.

155 W. Georgia St., Indianapolis, Ind.

CAPACITY 8,000,000 FEET PER YEAR (85)

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Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY DURABILITY

One, Two and Three Ton Capacity

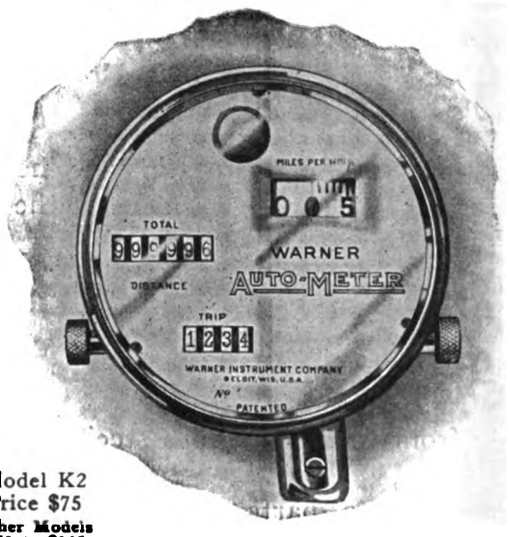
LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

Reliable Agents: Secure Your Territory for 1912 at Once.

THE LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

Branches and Agencies:

BOSTON—David Abrams, 131 Portland St.
NEW YORK—West Side Garage & Motor Co., 160-162 101st St.
CHICAGO—The Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
NEWARK, N. J.—Merchants Motor Car Co., Essex Building.
DETROIT, MICH.—Bierl Auto Truck Sales Agency, 453 Dix Ave.
DISTRICT OF COLUMBIA AND VICINITY—Bowles Motor Sales Co., Inc., 1608 14th St. N. W., Washington, D. C.



Model K2
Price $75
Other Models
$50 to $145

WARNER AUTO-METER

"The Aristocrat of Speed Indicators"

THOSE in other cars and who pass an Auto at the curb, say, "That must be a **good car.** See! It has a Warner on the dash!" The Warner is the Hall Mark of Quality on an Auto.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

Branches at

Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
Boston	Cincinnati	Detroit	Los Angeles	Pittsburgh	Seattle
Buffalo	Cleveland	Indianapolis	New York	Portland, Ore.	St. Louis

1,000 Island House

ALEXANDRIA BAY

Jefferson County New York

IN THE HEART OF THE THOUSAND ISLANDS

In the most enchanting spot in all America, where nature's charms are rarest, all the delights of modern civilization are added in the 1,000 Island House. No hotel of the Metropolis provides greater living facilities or such luxurious comfort—real **home** comfort—as does this palatial Summer retreat. An amusement for every hour, or quiet, complete rest, is the choice of every guest.

ALL DRINKING WATER USED IN THE HOUSE IS FILTERED

Send two 2-cent stamps for Illustrated Booklet.

O. G. STAPLES, Proprietor
HARRY PEARSON, Chief Clerk.

ESTABLISHED 1899
We Built the First Factory in the U.S. Especially for Automobiles



Grout Automobile Co.
MANUFACTURERS OF
THE POWERFUL GROUT MOTOR CARS

Motor Mart
Boston, Massachusetts

March 20, 1912.

Remy Magneto Co.

Gentlemen -

In reply to yours of recent date, as to what Remy service means to us, will say that it has been highly satisfactory for the past three years and our slightest magneto trouble is remedied at once.

In short we cannot praise your service too highly.

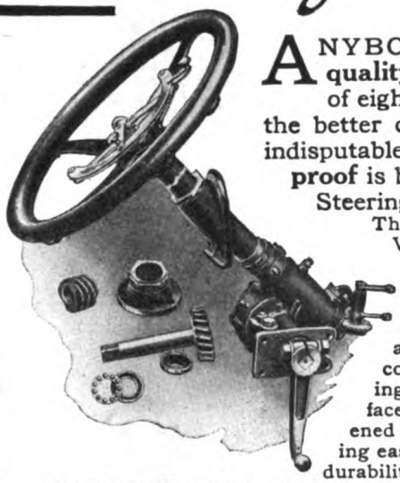
Yours very truly,

GROUT AUTO CO.
A. F. Kirkpatrick Mgr
Boston Branch

A postal will bring scores of letters like these
Remy Electric Co
Anderson, Ind.

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Warner Quality
Steering Gears



ANYBODY can claim quality—but a record of eight years use on the better class of cars is indisputable proof. That **proof** is back of Warner Steering Gears.

The prime features of Warner Gears are: accessibility; complete interchangeability; use of eccentric sleeves; adjustable angle of column; large bearing and contact surfaces specially hardened and ground, assuring ease of motion and durability.

The Warner line includes a wide range in both pleasure and commercial types.

We guarantee dependable deliveries.

Get acquainted with Warner Quality—make it another selling argument.

We modify our designs to meet your detail requirements, or build on approved designs on seasons **quantity specifications.**

Detroit Office 628 Ford Building

Philadelphia Office Glenwood Ave. & 2nd St.

Warner Gear Co.
Muncie Indiana

90%
Bosch Plugs

OF the 10 prize winning cars in the 500 Mile Sweepstakes of May 30th, all but the 10th car used Bosch Plugs. No test for plugs is so severe as the one given by racing cars.

DE PALMA'S Mercedes and the 2nd and 3rd cars used the Bosch Magneto—*of course.*

Be Satisfied **Specify Bosch**

Bosch Magneto Company, New York

The Hotel of Comfort

The WOODSTOCK

"You can walk from there to anywhere"

Our new addition is ready for occupancy.
We now have 360 rooms with 265 baths.
Write us for descriptive folder with typical floor plan and rate card.
Wire for reservation at our expense.

RATES

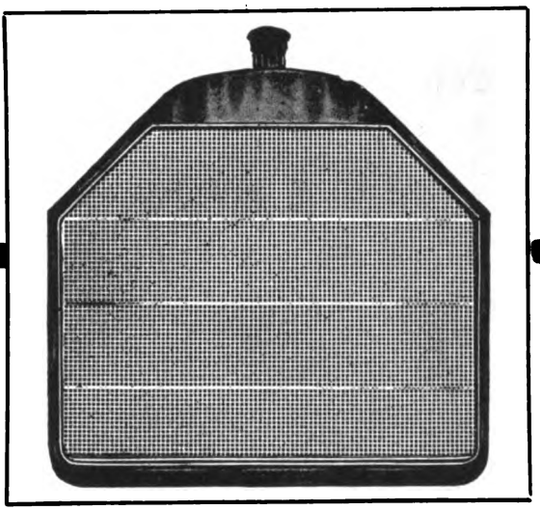
Court room with bath, for one, per day.....$2.50
Court room with bath, for two, per day..... 3.50
Outside room with bath for one, per day..... 3.00
Outside room with bath, for two, per day..... 4.00
Outside room with twin beds, for two, per day $4.00



HOTEL WOODSTOCK
127 W. 43d St.
New York

W. H. Valiquette, Manager.

Also
"THE BERWICK"
Rutland, Vermont



THE BUSH RADIATOR

IN EFFICIENCY—The Highest
IN APPEARANCE—The Finest
IN CONSTRUCTION—The Simplest
IN SERVICE—The Most Satisfactory

"The Most Practical Radiator"

Ask those who have used them.

THE BUSH MFG. CO., Hartford, Conn.

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BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

No Cranking! No Pumping!

START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

American Starter and Carburetor Mfg. Co.
2022 S. 40th Avenue CHICAGO, ILL.

United States Tires



ARE GOOD TIRES

Champion Spark Plugs

Special Designs for Every Type of Motor Made

CATALOG MAILED ON REQUEST

Champion Spark Plug Co.
TOLEDO, OHIO

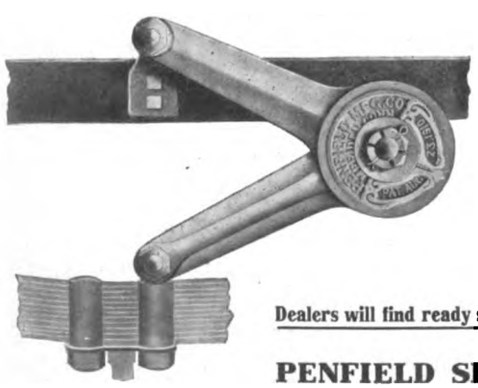
Price **$20** Without Cylinder Attachments

"The Crankless STARTER"

By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.

Guaranteed by our 40 years standing and reputation.

COX BRASS MFG. CO. Established 1872 **Albany, New York**



The Penfield Shock Absorber

Compensating Spring, shown here as attached to car, operates through a triple circular coil, positively absorbs both shock and recoil—eases the springs under all conditions.

Saves riders, power plant, springs and tires, conducing comfort and preventing wear and tear.

Cannot Break — Needs No Adjusting — Has Absolutely No Wear

Dealers will find ready sale for this shock absorber.

Standard for cars over 3000 lbs., per set of four, $50.00.
For cars less than 3000 lbs., per set of four, $45.00.

PENFIELD SHOCK ABSORBER MFG. CO., 51 Randolph Ave., Meriden, Conn.

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WINTON SIX

One Factor in Winton Success

The Winton Company has never striven for a record-breaking output.

It has always been our aim to produce the finest car that we could build, and let quantity take care of itself.

Individual attention to every car we produce is a big factor in the Winton Company's success. It pays to produce a quality car.

Shall we send you a catalog?

THE WINTON MOTOR CAR CO.
426 Berea Road **Cleveland, O.**

FRANKLIN G TOURING

The seventh year for this model—the same high grade material and workmanship as the larger Franklin models.

BETTER THAN EVER BEFORE

Horse power with the G touring has been increased from eighteen to twenty-five.

Wheel base is 103 inches. The car turns around easily in a narrow street.

Tire equipment is 32" x 4" front and rear.

Franklin quality throughout, it is a high grade small car.

Body is of aluminum and will not rust, check or crack.

Full equipment included.

FRANKLIN AUTOMOBILE COMPANY Syracuse N Y

Hupmobile

Long-Stroke "32" Touring Car $900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.

Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

20 H. P. Models

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Electric headlights, electric and oil side and tail lamps, folding dash seat for third person. Rear tires, 31 x 3½ inches. With 110 inch wheelbase, $1150.

HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

Abbott-Detroit 1912 MODELS

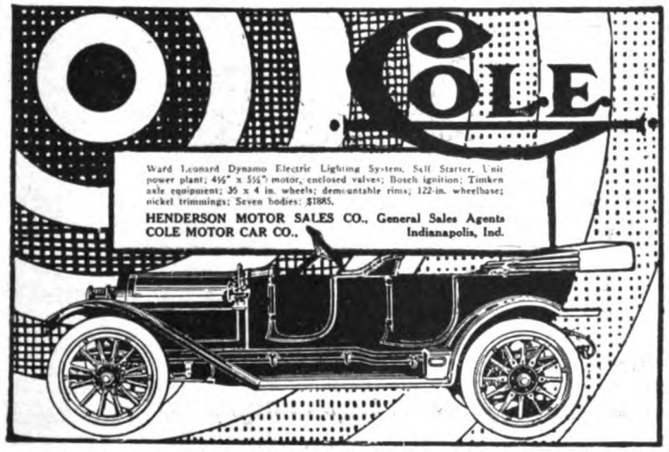
MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY
607 Waterloo Street **Detroit, Michigan**



Mais Motor Trucks

Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

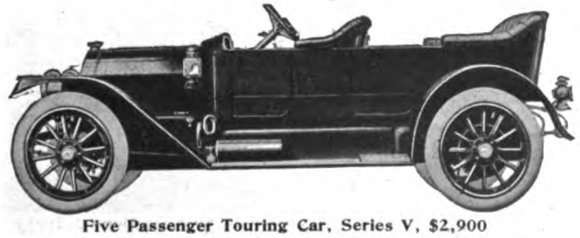
It is a Certainty

Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.

National 40

Stock Champion



Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY
1007 E. 22nd Street **Indianapolis, Ind.**

Empire Twenty-Five

The Little Aristocrat

This is the Big Brother of the Famous Empire Roadster and is a small edition of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.
224 Massachusetts Street **Indianapolis, U. S. A.**

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ANNOUNCEMENT

Pleasure Cars - 7 Models
Delivery Cars } - 4 Models } $850 to $3500
Trucks

Now Closing 1912 Contracts

PETREL MOTOR CAR COMPANY
2530 First Avenue Milwaukee, Wis.

Ford
THE UNIVERSAL CAR

Its lightest—rightest—most economical—that's the reason we'll make seventy-five thousand of them this year. Prices $590 to $900. Agencies everywhere.
Ford Motor Company Detroit, Mich.

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

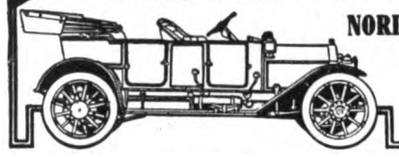
PULLMAN MOTOR CAR COMPANY
222 N. George Street YORK, PA.

The Easiest Riding Car in the World

MARMON

INTERNATIONAL CHAMPION

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750. Ask for Catalog.



NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

1912 WRITE FOR AGENCY TODAY

This Year it's the Glide 36-42

ANYONE who will take the time to investigate the merits of the $1550 "Glide" and compare it with cars costing $1000 more and over, can prove for himself why the "Glide" is best. Send for handsome book and learn of the

5 to 7 Years' Service

—read of the mechanical perfections, the comfort features, appearance, style and guarantee back of the "Glide"—and you will become a "Glide" owner, also. Dealers write for select territory now open. Get FREE book and ask for our proposition. Write today.

THE BARTHOLOMEW COMPANY, 220 Glide Street, PEORIA, ILL.



The American Underslung

WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

American Motors Co., Dept. E, Indianapolis, Ind.

Stearns
THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta Minneapolis and San Francisco

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Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.
CARTERCAR COMPANY, Pontiac, Michigan

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Start Your Car 25 Times for a Cent

INVINCIBLE STARTER

will start any four-cycle engine of four or six cylinders. Turn on the switch—that's all.

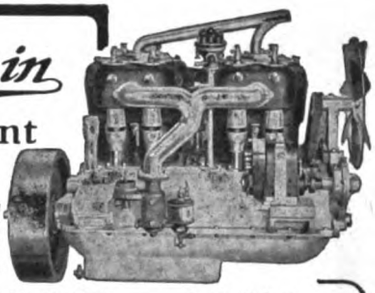
Price, NOW, Only $10

Fully guaranteed. Money back if not satisfied. Send your order today, stating make and model of your car. Illustrated Catalog Free.

INVINCIBLE STARTER CO., 748 Penobscot Bldg., Detroit, Mich.

Wisconsin

The Consistent Motors



Real masterpieces of engineering skill. Note their special features — examine their perfect construction.

Large Bearings — Double Ignition — Large Valves
Perfect Workmanship — Perfect Lubrication — Heavy Crank Shaft
Ample Water Jacket — Long Stroke

ALL 4 CYCLE — IN 5 TYPES — 3 3-4 In. bore, 5 n. stroke, 4 cyl. — 4 1-4 In. bore, 5 In. stroke, 4 cyl.
4 1-4 In. bore, 5 In. stroke, 6 cyl. — 4 3-4 In. bore, 5 1-2 In. stroke, 4 cyl. — 5 1-4 In. bore, 7 In. stroke, 4 cyl.

Write us and we will tell you where a Wisconsin Motor may be seen.

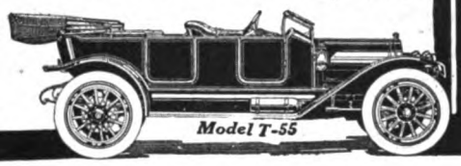
WISCONSIN MOTOR MANUFACTURING COMPANY, Dept. 32, Milwaukee, Wisconsin

THIS *Cutting* CAR

Has more Horsepower and a longer Wheel Base than any other Four Cylinder Automobile in the World selling for this price $1850

Send for our Chart of Comparative Motor Car Values

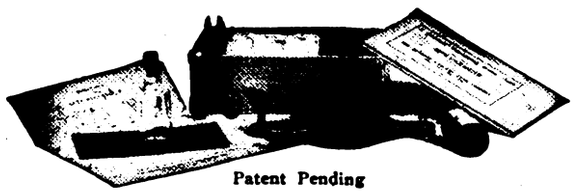
Clarke-Carter Automobile Company
Jackson, Mich.



Model T-55

WARNING

PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



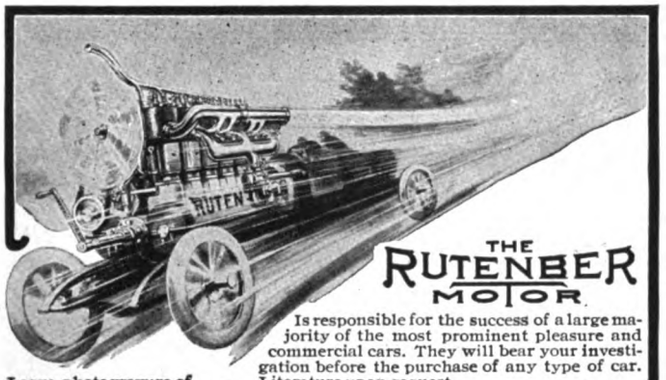
Patent Pending

ADAMSON Auto-Vulcanizer

Ever-Ready

Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio



Large photogravure of the above cut for framing 14c in stamps.

THE RUTENBER MOTOR

Is responsible for the success of a large majority of the most prominent pleasure and commercial cars. They will bear your investigation before the purchase of any type of car. Literature upon request.

THE WESTERN MOTOR CO., Marion, Indiana

If You Need Motor Lamps

You Need This Catalog

We want you to write for the Solar Catalog before you decide on your motor lamps, for this is the most complete line of lamps on the market. Solar Lamps have been preferred by most motorists for the past fourteen years because of their brilliancy, their style, their strength and their several exclusive advantages —their special short focus lead glass lens mirror reflectors—the patented double ray light projection (in the Solarclipse), giving two distinct fields of light, for city and country use—the new black finish, the only such finish that's proof against heat and moisture—and other features that other lamps lack.

To fail to see Solars before you buy is to fail to include in your consideration the very finest lamps in existence. Solars are made for oil, electricity, gas and in combination, for pleasure cars, motor trucks, carriages, motor boats and airships. Write for catalog now—while you think of it. (136)

Kenosha, Wis. **BADGER BRASS MFG. CO.** New York City

SOLAR LAMPS

"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.

AUTOMOBILE OWNERS AND TOURISTS

should break their journey and avail themselves of the excellent facilities afforded by the D. & C. Lake Lines, operating daily service between Detroit and Buffalo and Detroit and Cleveland.

Enjay the delights of the cool breezes from Lake Erie and resume your journey in the morning after a refreshing night's rest. Special attention given by this Company to the handling of automobiles. Rates quoted on application (state wheel base); Tanks of Automobiles must be emptied of gasoline before being shipped; three gallons of gasoline supplied free on arrival at destination.

Roads in this section of the country are in first class condition; new road now under construction between Detroit and Toledo. Tourists speak highly of the route between Buffalo and New York.

On your trip this summer bear in mind "The Waterway is The Only Way."

DETROIT & CLEVELAND NAVIGATION CO.,
General Offices, Detroit.

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Empire Tires
WEAR LONGEST
EMPIRE TIRE CO., Trenton, N.J.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

MICHIGAN BUGGY COMPANY, 188 Lay Blvd., Kalamazoo, Mich.

THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

K · D

The Motor With the Sliding Crescent Valve

KNIGHT-DAVIDSON
1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

The Kinsey Manufacturing Company

TOLEDO, OHIO

Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager,
1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

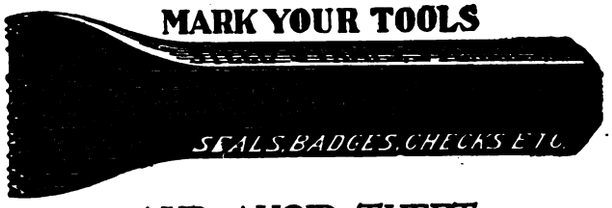
H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

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AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

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$30.00 for a **$105.00** **6** cylinder
$20.00 for a **$93.00** **4** cylinder
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Imported U. & H. High Tension Magnetos Less Than Import Cost

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Some automobile owners are always cleaning their spark plugs —others who use Reliance Plugs don't have to.

The Reliance book, "Ignition and Spark Plug Talk," tells why. Supposing you write today and get a copy.

JEFFERY DEWITT CO.
65 Butler Avenue Detroit, Mich.
Largest Exclusive Spark Plug Manufacturers in the World



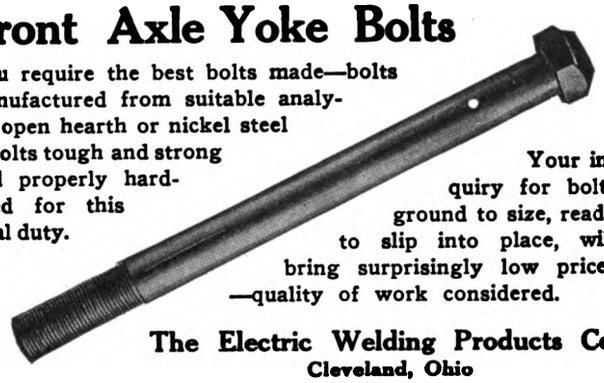
Patent "Luxury" Folding Seats

Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

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Front Axle Yoke Bolts

You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel —bolts tough and strong and properly hardened for this vital duty.

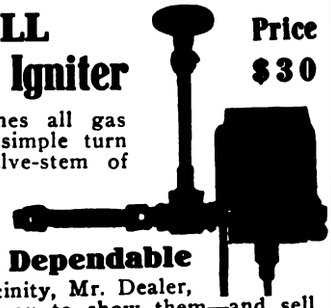


Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices —quality of work considered.

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THE GRINNELL Gas Controller and Igniter

Price $30

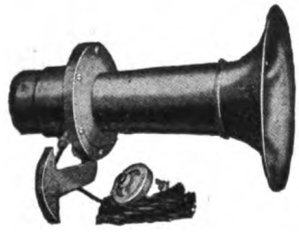


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Convenient — Safe — Dependable

Every car owner in your vicinity, Mr. Dealer, will be interested—it's up to you to show them—and sell them. Write for booklet and dealer discounts.

THE G. C. A. MANUFACTURING CO., Pittsfield, Mass.
Sole Licensed Manufacturers for the United States



Put a **NEWTONE** On Your Car

Price $20 Complete with Button and Cable

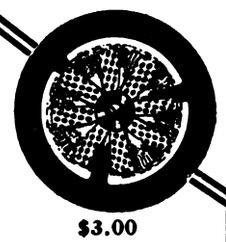
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Let Us Send You One on Approval

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THE MIXER



$3.00

Saves 10% to 25% Gasolene and Improves Your Engine

GYREX fits intake pipe. Spins around at great speed and "mixes the mixture." Attached in five minutes. Send us $3.00 ($3.50 Foreign) and we will send it to you on trial. If not satisfactory your money is cheerfully refunded.

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4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500

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The Fiat Agency Policy is One of Permanency

POUGHKEEPSIE **F.I.A.T.** NEW YORK

The Electric Car of Quality

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Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

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DEALERS—Wire now for territory which is choice but going fast.

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The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS - SIX - HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

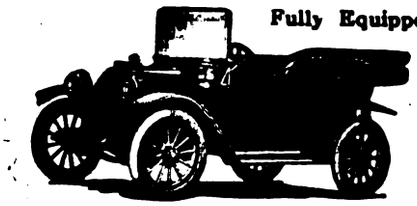
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HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



35 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

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Electrically Self Started and Lighted

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Six Models 40 & 50 H.P. Fully Equipped

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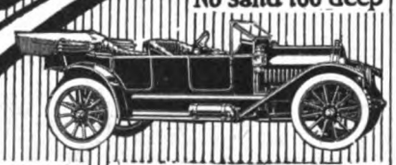
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MODEL 52 $1800
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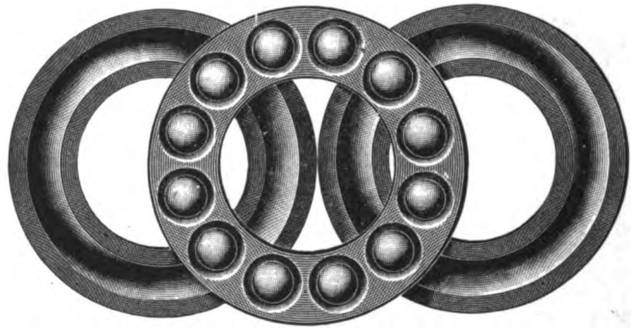
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Speedo
IT'S GUARANTEED
Price $3.50 With Descarbonizer High Power Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

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Best on Earth — Kantsamore
ESTABLISHED 1855
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Automobile Wheels
For Pleasure Cars and Trucks

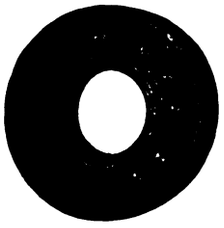
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$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

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Manufacturers of High Grade
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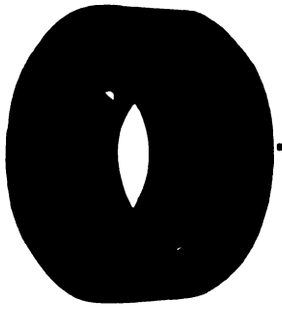


All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.

Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.

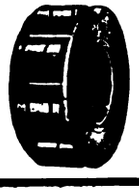
The Wm. Cramp & Sons Ship and Engine Building Company
PHILADELPHIA, PA.

Eliminate Noise in Your Car



Use Hyatt Roller Bearings





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Detroit, Michigan

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Durability, Economy, Reliability, Power and Speed make our satisfied customers.

4 Speeds Forward **KLINE KAR** Self-Starting

MR. DEALER, GET WISE—A line of high grade cars at prices that people are paying for cheap cars. Write us today.

4-30	$1700 $1750	4-40	$2200 $2250	6-50	$2800 $2850	6-60	$3300 $3500

All Models Completely Equipped.

KLINE MOTOR CAR CORPORATION, York, Pa. Factories: York, Pa. Richmond, Va.



"Firestone" Tires and Rims

are the least likely to require changing, and afford the best means of tire changing when required.



The Firestone Tire & Rubber Co., Akron, Ohio
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Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

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Is the Standard of the World. Winner of the Gold Medal. Proven accurate by the leading Universities. Constructed on the principle of Centrifical Force.

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Automobile Frames and Special Stampings

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

PRESSED STEEL

FRAMES

A. O. SMITH COMPANY
MILWAUKEE

Standard Universal Rims

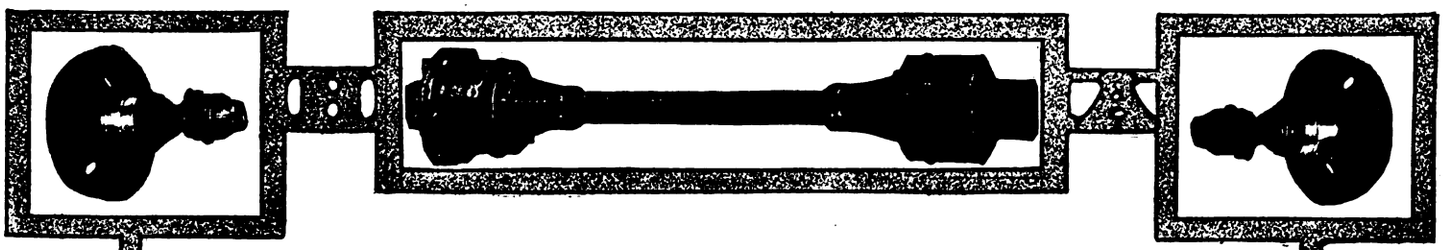


fit any style or make of tires. The side rings are reversible, they curve outward on one side to fit a straight side tire, inward on the other to accommodate a clincher. Two turns of a nut unlocks the rim for demounting, two more turns locks the rim in place. Write for catalog 607, which explains fully.



THE UNITED RIM COMPANY, Akron, Ohio

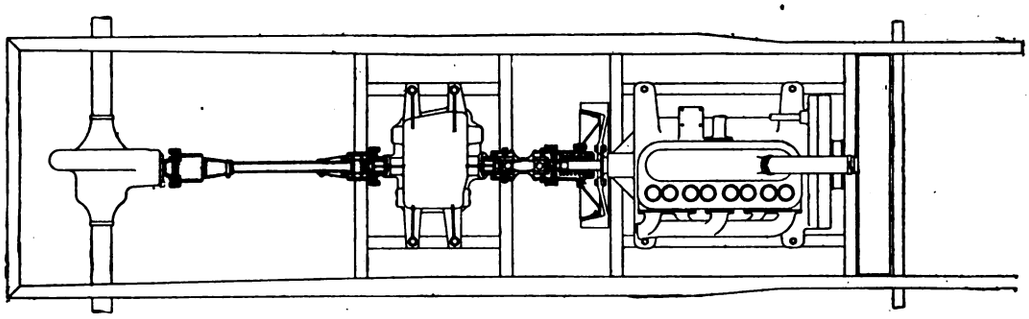
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This illustration shows the detail of our M-500 clutch and J-600 drive as applied to standard pleasure car design.

In this, as in all other installations, we have made theory agree with practice and we offer equipment shown here to car manufacturers who appreciate the importance of correctly designed and strongly constructed clutch and drive detail.

Simplicity, accessibility and strength characterize this equipment, and these qualities have made it standard on a long list of well known cars. The price we have set on quantity orders will interest every purchasing agent who wants parts of quality at cost within reason.



Our years of experience in this important branch of car construction enables us to render service to the manufacturer and through him to the ultimate user.

We have specialized in this branch — we have gone deep into the problem and have, as a result, given shaft drive and universal joint products that bear all of the ear marks of Hartford quality of material and precise manufacturing methods.

Send us your specifications and we will mail blue prints and prices —or if you can send blue prints, so much the better.

J. S. BRETZ CO., New York, Detroit,
Sole Selling Agents.

CONE CLUTCHES

HARTFORD AUTO PARTS CO.
HARTFORD, CONN.

UNIVERSAL JOINTS

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Studebaker

FLANDERS TWENTY

E-M-F THIRTY

How Will Your Car Be Built?

How your car will be built is too important a matter for you to take for granted. It is the crux of the whole question of what you get for your money. And there is today, as there always has been, a vital difference in the construction of different cars. Most cars are good enough, some are better and one or two are absolutely best.

What you really get for your money is determined back in the factories where your car is made. Don't forget that.

And today, just as in the past, The Studebaker Corporation has the largest, the best automobile factories in the world.

The Studebaker-Flanders "20," for example, is built from iron and steels made to our own specifications by Pittsburgh mills and every shipment we receive is chemically analyzed to maintain our standard. Our own mighty hammers drop-forge no less than 226 parts for every Studebaker-Flanders "20." Studebaker foundries cast Studebaker cylinders with a degree of accuracy not purchasable in the open market.

All our steel is heat treated and, where necessary, case-hardened in Studebaker ovens and by our own secret processes.

Through all the marvelous milling and grinding operations which transform the rough forging or casting into the finished piece, as delicately measured as a watch, accuracy is the keynote and at every point inspection is rigidly exact.

It is Studebaker manufacture by Studebaker processes, and the genius of it is quantity production by automatic machinery. The hand will make mistakes, the automatic machine, never.

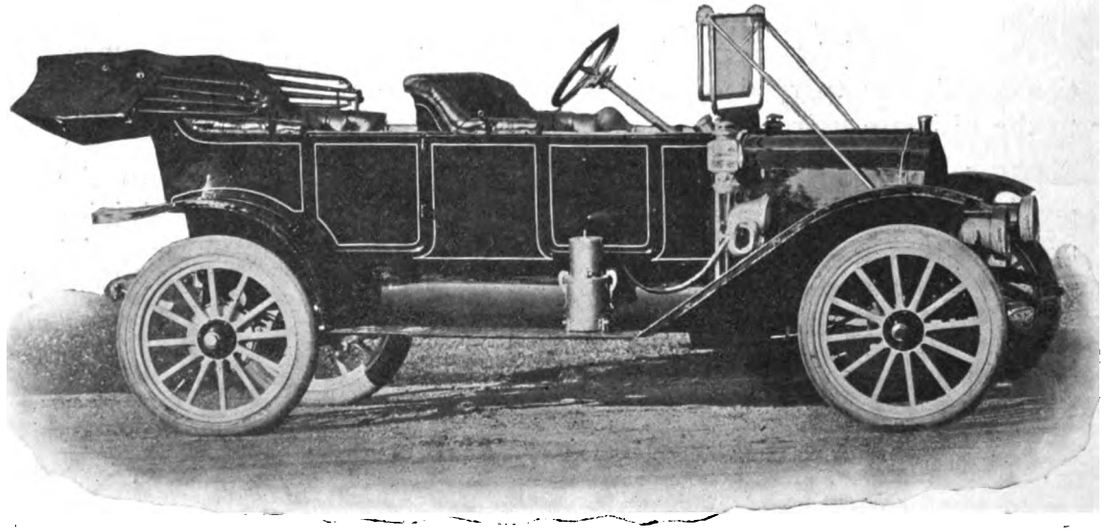
Studebaker cars are not assembled cars in any way. They are built, practically entire, in Studebaker factories. This means a great deal to an owner. How much, any experienced automobilist can tell you. We know, and you can be certain of, your Studebaker car.

If you are offered a car at less money than a Studebaker-Flanders "20," make a few comparisons. Consider the appearance, comfort, transmission design, spring suspension, rear axle and brake construction, sufficiency of bearings, steering gear, and other important features.

If some one urges on you a car at higher price, make the same comparisons, and weigh the fact that the Studebaker system of manufacture enables us to build better and cheaper than any maker with inferior facilities possibly can.

Studebaker cars are one price to all, with a fair profit to the dealer, because they are honestly built and honestly priced. And remember that the dealer must make a fair profit if he is to remain in business.

When you buy a Studebaker-E-M-F "30" or Studebaker-Flanders "20" you get a car built in the best factories in the industry by men whose name for years has been a byword for business honor. You couldn't ask more and you needn't get less.



Studebaker-Flanders "20" Touring Car, standard equipped.....$800, F. O. B. Detroit.
Equipped with Top, Windshield, Prest-O-Lite Tank and Speedometer, $885, F. O. B. Detroit.

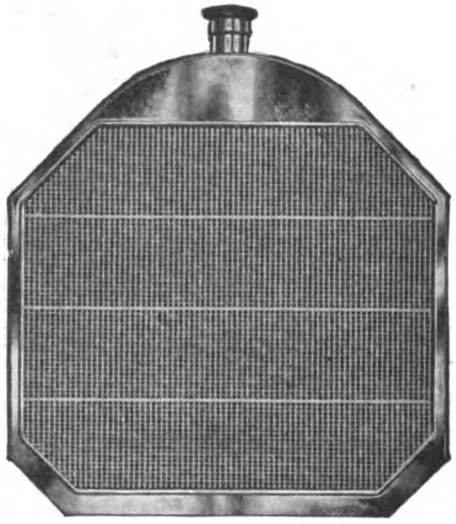
STUDEBAKER MODELS

Studebaker-Flanders "20"		Studebaker-E-M-F "30"	
Touring Car	$800	Touring Car	$1100
Roadster	750	Detachable Demi-Tonneau	1100
Delivery Car	800	Roadster	1100
Utility Car	800		

Our new Art Catalogue B will Interest You. Send for it.

THE STUDEBAKER CORPORATION, Detroit, Mich.

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The Mayo—the radiator thoroughbred

¶ Every Mayo Radiator leaving this factory has been judged and found perfect. Our system of testing and inspection is rigid.

¶ It follows that every Mayo Radiator must perform the work for which it was designed.

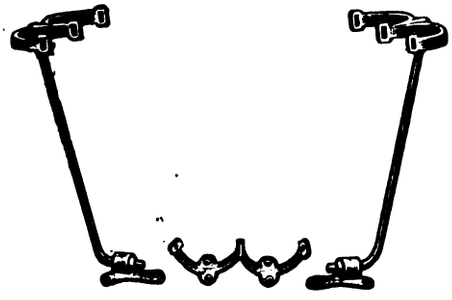
¶ And right design, plus right material, plus right construction must combine to spell "perfection."

¶ After you have had the Mayo system explained, you will not hesitate to specify Mayo for the car.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

The Largest Automobile Supply House in America
FIFTEEN STORES I'N THE UNITED STATES

"Torpedo" Tire and Demountable Rim Holders



Designed especially for use on Torpedo body or Fore-door cars Set consists of two strong arms firmly bolted to running board and permitting of sufficient adjustment to accommodate two tires or demountable rims, of standard sizes, 4 inch or smaller. Made of solid Brass and guaranteed to give perfect satisfaction.

Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

	Brass	Black
Price, complete with Straps...	$4.00	$3.00

A dozen other styles and sizes in stock. See catalog.

Our 1912 Catalog, which is held as a book of reference by manufacturers, dealers and automobile owners, will be mailed on request. Circulation limited to 100,000 copies.

Chas. E. Miller
MANUFACTURER, JOBBER, EXPORTER AND IMPORTER

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NEWARK, N. J.—274 Halsey St.
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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

A Proven Success.

THE TUTO Horn has won out through merit alone.

¶ When it was first introduced, nearly two years ago, dealers, car makers and even car owners were skeptical, as the TUTO mechanism was so simple that it was placed in the class of electrical warning signals which were not entirely successful.

¶ We knew that the old "vibrator horn" was far from a success, and while retaining the simple principle of operation, the TUTO horn was made as efficient and positive in operation as other celebrated DEAN constant service electrical equipment.

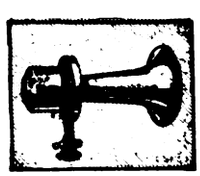
¶ The TUTO Horn was designed for continual service and constructed of the proper materials so as to withstand the most severe tests of service, heat, cold, moisture, etc., that could be encountered when on the motor car.

¶ Furthermore, the TUTO Horn has withstood this service and all kinds of break down tests which can be devised by motor car engineers without developing any troubles whatever.

¶ Unfailing service of the TUTO Horn, throughout this period has sold many thousands to car owners. Car makers have been quick to recognize the many advantages of the TUTO Horn and furnish it regularly as special or standard equipment.

¶ The TUTO Horn has overcome every obstacle and to-day is acknowledged the bes warning device procurable.

¶ The exclusive two-toned feature, the completeness of equipment, neatness of installation make the TUTO Horn best for standard equipment. It is not necessary to experiment with incomplete signalling devices when selecting a warning signal equipment for 1913 cars. The TUTO has received the stamp of approval of the most discriminating owners and has withstood the test of time.

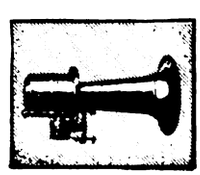


TUTO Horn, $25.00

The Dean Electric Co.

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

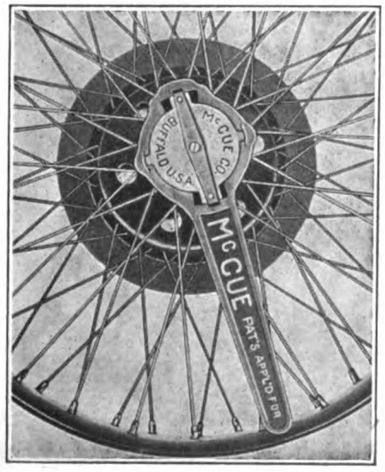
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70% MORE TIRE WEAR WITH McCUE WIRE WHEELS

THE more miles car owners get out of their tires, the more car owners there'll be. That's why it's interesting to know just how and why McCue Wire Wheels increase tire mileage—68.75% according to exhaustive test made by the Daimler Company.

As explained in previous advertisements, the fact that the metal rims and spokes dissipate most of the heat generated by the friction of driving, figures most prominently in the saving.

But in addition McCue wire wheels effect another big saving because of their resiliency and shock absorbing ability. To illustrate. If a rock is struck by a tire on a wooden wheel, the shock of the impact mashes the fabric, because of the rigidity of the wheel of wood. But if the wheel be wire, the shock, instead of spending its energy smashing the fabric of the tire, is absorbed by the wheel itself largely and the tire is saved. In other words wire wheels allow tires to be worn out, whereas wooden wheels insure the tires being blown out long before the tire is worn down to the tread.



McCue Axles are made for either wooden or wire wheels on the same spindle.

The McCUE COMPANY
BUFFALO, N.Y.

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The NATIONAL STARTER

THIS mechanical starter is the only true solution to the problem of eliminating the old-fashioned crank.

We want to emphasize the fact that the National Starter has been designed and made to turn the engine naturally, easily, and, if necessary, repeatedly, giving the motor a chance to start as its builders intended that it should start—from a mechanical turn over.

You would not operate your clutch, transmission or brake through the medium of electricity, air or gas!

Why, then, depend upon these mediums to start the engine, knowing as you do that none of them will act safely, unfailingly and without cost of operation?

You ought to know how it is possible to get leverage enough to make this device responsive to a tentative pressure of the foot, for such operation may seem, at first thought, impossible.

The answer is simple.

The National Starter performs its work through cleverly designed gear reduction, involving long, patient research and preliminary work entailing thousands of dollars expense to us.

The finished result, here offered, removes practically all of the muscular effort formerly required to hand crank against engine inertia or back pressure.

The operator of a National Starter does not leave his seat. He does not even change his position. With practically no effort on his part, he spins the engine until gas and spark continue the operation.

We have eliminated all danger from back-firing, for any inclination of the engine to balk instantly disengages the gears and allows the shaft to run free.

Now, Mr. Manufacturer and Dealer, consider these points:

We do not have to tell you that, aside from the fact that all starters operating through unnatural mediums, involve a certain amount of danger to the engine and at times to the occupants of the car—we do not have to tell you that the cost of operation of such devices runs into considerable money.

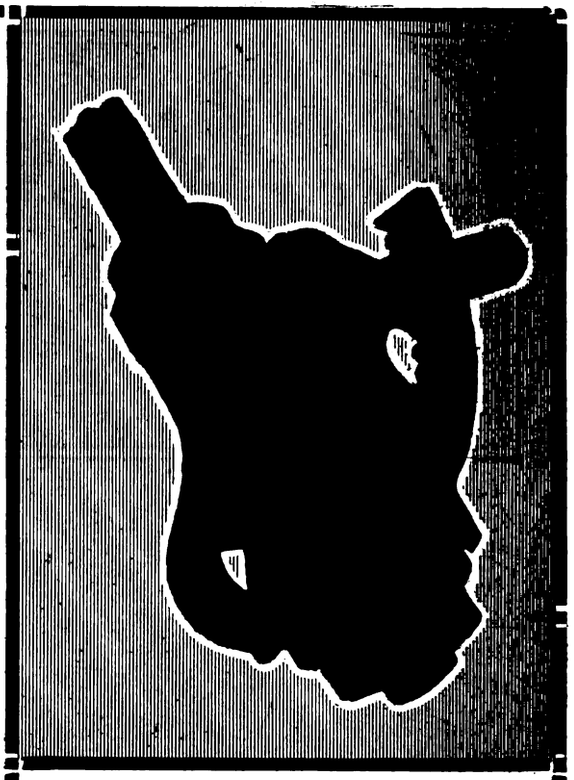
You know these things.

The National Starter cannot injure machinery or rider. The first cost is the last cost. Once installed, it will not entail one cent's worth of operating expense—it will start one hundred times out of one hundred and it will outlast and outwear a half-dozen of more complicated and less efficient self starters.

This subject is worth investigating and we ask you in the interest of studying mechanical perfection, to get full information covering the National Starter. It is yours to command.

NATIONAL GAS ENGINE STARTER COMPANY

30-32 North Dearborn Street CHICAGO, ILLINOIS



DEALERS—

Sooner or later your trade will find out that gas, electricity and compressed air are mighty uncertain and sometimes dangerous car starting agencies

The mechanical 100% efficient solution to self starter troubles has already arrived

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THE MOTOR WORLD
Hyatt Roller Bearing Editorial

Detroit, Mich., June 13, 1912.

The Car Purchased

A Righteous Man regardeth the life of his beast (Prov. XII, 10); commonly quoted—"The merciful man is merciful to his beast;" and modernized, "The man of sound mind abuseth not his car." Only by conscientious application of this principle can longevity be assured any machine, no matter how well it is constructed.

The Easiest Way to preserve the whole is to care for the parts. The wise salesman, therefore, instructs his customers in the essentials of economical motor operation, intelligent gear shifting, and careful attention to lubrication. He also cautions against the inevitable results of overloading, skidding, hitting minor obstructions at considerable speed, etc.

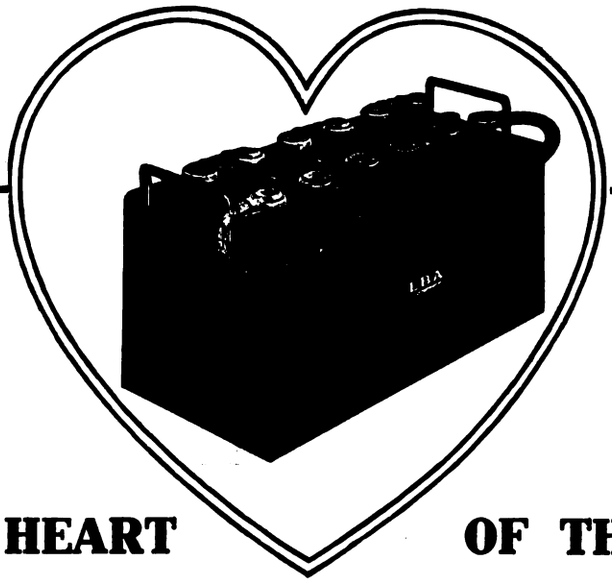
Lubrication of Bearings alone is a subject worthy of far more attention than is accorded it. Yet a moment's thought will show anyone the absurdity of expecting a roller or ball bearing to operate properly when dry or when the lubricant is filled with flakes of metal or other foreign substance. Even graphite in its ordinary form takes up space required by the rollers or balls, and its use should be avoided.

Acid in Oil is like arsenic in food—that is, so far as its ability to enhance the value of the food is concerned. Avoid acid as you would the poison. And if, for example, you use grease in your gearset, just remember that it has to be soft enough to penetrate the bearings as well.

A Factor of Safety is allowed in the design of any structure—including the motor car—yet as soon as the normal load is far overreached the mechanism is unsafe. Failure of some part is bound to occur. Motor cars can be overloaded in a variety of ways. Should your bearings fail, consider well the circumstances before blaming the bearings.

Abuse Kills Anything, but some things—as well as some people—can stand up under it longer than others. Few cars—and few bearings—work under ideal conditions. That is one reason why roller bearings, and flexible roller bearings in particular, are gradually replacing the more sensitive balls. This means Hyatt.

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THE HEART OF THE

ELECTRIC SELF CRANKER

IS THE

GLBA

(Class B)

SELF CRANKING BATTERY

It is full of energy—try it on your car and see it rotate your motor.

With a Self Cranker You Can Easily Have ELECTRIC LIGHTS

Class A Batteries are for ELECTRIC LIGHTING only
Class B Batteries are for ELECTRIC CRANKING and LIGHTING

Write us for full information.

WILLARD STORAGE BATTERY COMPANY

CLEVELAND, OHIO

NEW YORK BRANCH: 136 W. 52d Street DETROIT BRANCH: 1191 Woodward Avenue CHICAGO BRANCH: 436 So. Dearborn Street

Agencies in All Principal Cities in the United States and Canada

JUST PUSH A BUTTON AND CRANK YOUR MOTOR

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A Few Questions for the Dealer Who Is Not Yet Making Firestone Tires His Leader

Did you ever work hard to build up the sale of a particular brand of tire, only to have the tire suddenly go-to-pieces, and your tire business follow-suit?

?

Have the tires you recommend backed up the Dealer for twelve consecutive years?

?

How much further along would you be today, in Sales, Influence and Profits if you had taken on Firestone Tires and allowed your business to keep pace with their steady and rapid growth?

?

Our enormously increased facilities enable us to back you up in *deliveries*, as well as in the wearing quality of Firestone Tires.

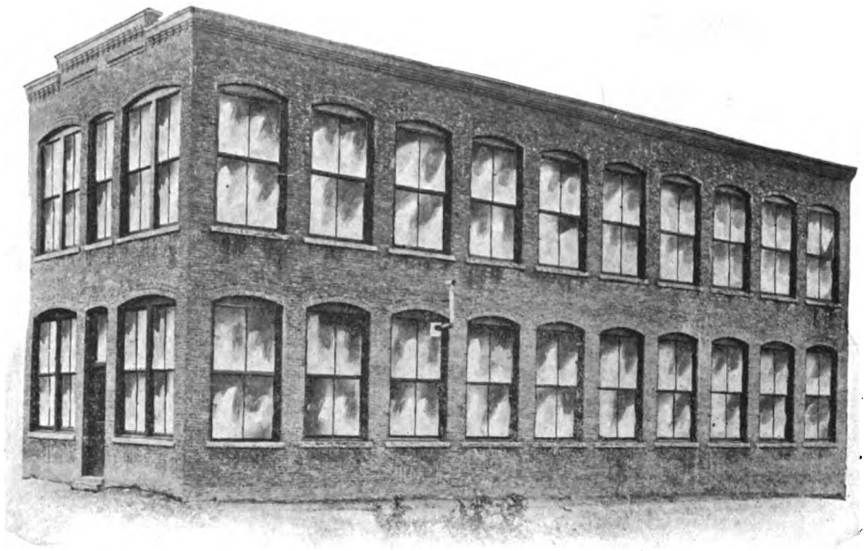


THE FIRESTONE TIRE & RUBBER CO., Akron, Ohio

"America's largest exclusive tire and rim makers"

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New Departure Engineering Building



METALLURGICAL LABORATORY : CHEMICAL LABORATORY
PHYSICAL LABORATORY : HEAT TREATING LABORATORY
ENGINEERING SERVICE DEPARTMENT

Every inch of the large floor space in this building is devoted to two supremely important purposes:

The perfection of New Departure ball bearings by progressive improvements in materials, manufacturing processes and general efficiency of the product.

A study of the practical problems and interests of users of anti-friction bearings, with a constant aim to assist in selecting just the ball bearing equipment that will give greatest efficiency at minimum cost of installation and maintenance.

We have secured an equipment for each department that is not excelled anywhere, particularly with reference to ball bearing manufacture and consultation service.

Our exceptional facilities are yours for the asking. In other words, the co-operation of our entire engineering department is at your command for the selection of the type and size of ball bearings adapted to your design and work. Write us today.

The New Departure Manufacturing Co.

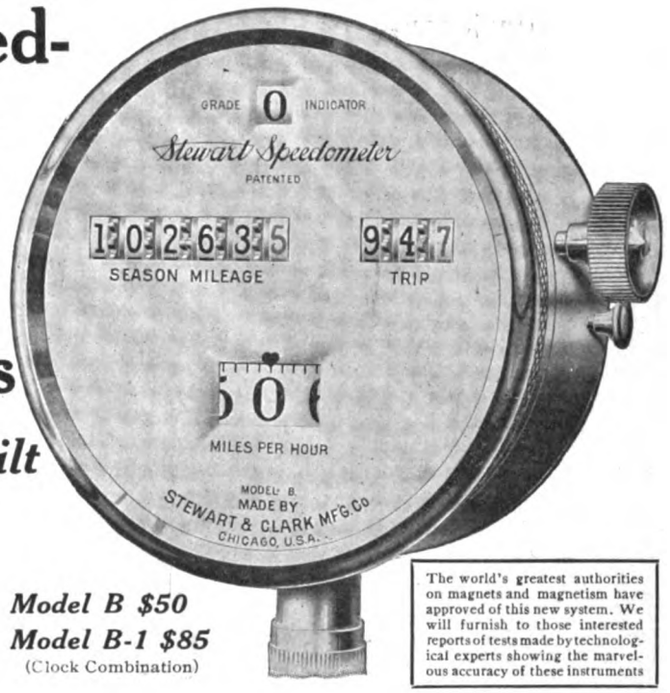
BRISTOL, CONN.

Western Branch, 1016-17 Ford Bldg., Detroit, Mich.

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A New Stewart Speedometer with Grade Indicator from the World's Greatest Speedometer Factories

No Finer Speedometer Ever Built



Model B $50
Model B-1 $85
(Clock Combination)

The world's greatest authorities on magnets and magnetism have approved of this new system. We will furnish to those interested reports of tests made by technological experts showing the marvelous accuracy of these instruments

FACTS AND FEATURES

This instrument operates on the magnetic principle. A perfectly balanced dial cup is positioned in jewel bearings in the field of a *permanent* magnet and is acted on by the Foucault or eddy currents from a permanent magnet when the latter is rotated. As is well known, this torque or pull on the cup is directly proportional to the speed at which the magnet is rotated. The indicating figures are cut directly on the dial. (*We are owners of the early patent on speedometer with rotating dial.*)

This New Instrument Differs from Other Magnetic Speedometers

First, and of vital importance, is the improved magnet — (*developed by Stewart engineers*) — the magnet in the form of a *closed ring*.



Every engineer and electrician will appreciate this real improvement. A continuous metallic path for the flux is thus assured that insures *absolute permanence*. A *keeper*, as it were, is *constantly* provided. In fact, the keeper is an *integral part* of the magnet itself.

This ideal form of magnet permits of entirely dispensing with the field plate, or field ring, heretofore used, thus greatly simplifying the mechanism and permitting greatlyincreased space in the case, thus accommodating a liberally proportioned temperature compensator.

This temperature compensator is an exceedingly simple arrangement of a bi-metallic coil that, responsive to temperature changes, actuates a quadrant arm carrying the spring. The action is direct and positive; having virtually no resistance to overcome, no load to lift or sustain, the action is dependable.

Temperature Compensators and Grade Indicators Are Exclusive Features of Stewart Speedometers

The grade indicator is an integral part of the instrument. The dial, actuated by a unique mechanism, indicates exactly the grade that the car may be ascending or descending at any time. A valuable feature, and one greatly appreciated by automobile factory engineers, who see in it great possibilities for a more rational use of speed change levers on their cars.

A New Odometer of the Highest Grade

Large size number wheels driven by a train of large, coarse-pitched actuating gears, no springs. The simplest, highest cost and highest grade odometer ever used in this class of instrument.

The Equipment

Stewart Speedometers are fitted with the strongest flexible shaft. This we believe everybody concedes. We have been for more than 20 years the largest makers of flexible shafting in the world. The swivel joint, *first used on Stewart Speedometers*, and now widely copied, is another detail on which we spend more money than others.

Our swivel joint is made of hardened steel forgings (not castings), unbreakable, and will outlast the car to which it is attached.

The forged swivel joint is an exclusive feature of Stewart Speedometers. **We have spent during the past year over $100,000 providing buildings and machinery for producing *this one item* of speedometer equipment, that we might be enabled to make a high grade, unbreakable drop forged steel joint at a cost that would not prohibit using them even on our lower priced instruments.**

Clock Combinations

We point to improvements and features that can be purchased only in combination with Stewart Speedometers. We use a Seth Thomas clock, rim wind and rim set. Stop for a minute and think what this means. To wind it, you merely turn the rim of the clock—no key to hunt for; no taking off the bezel each time you wish to wind or set it. To set the clock, you merely pull out and turn the same rim—no unsightly knobs to destroy the beauty of the clock or openings in the case — sure to permit the entrance of water and dust—liable to put the clock out of commission.

Our experience with other makes of clocks used on speedometers has proven that Seth Thomas clocks are the best for the purpose.

Factories

Stewart Speedometers are made in the largest speedometer factories in the world. The buildings were designed and built for the purpose; they are of the highest grade construction, completely protected from fire by automatic sprinklers and other devices. The factories cover an entire city block and have a total floor space of about four acres. Nearly 600 expert workmen, exclusive of a factory office force of 60, and a shipping room force of 50, are employed. We pay the highest wages and salaries. Machine equipment is the finest obtainable, the automatic screw machine department comprising over 60 machines. From the ponderous double acting presses, used for drawing up the case or shell, to the finest jewel lathes, every piece of machinery is the most suitable for the purpose that money will purchase.



Largest Speedometer Factory in the World

Service Stations

The Stewart & Clark Manufacturing Company operate a chain of service stations extending from Boston to San Francisco, as well as in London, Paris, Australia, Africa and New Zealand. Stewart Speedometers are not put on the car and ignored. They are guaranteed for five years, and with service stations all over the world, it is possible for car owners whose cars are equipped with Stewart Speedometers, to get unequaled service.

Product

It is the aim of the managment to make Stewart Speedometers the finest that money will produce.

The Choice of Most Car Manufacturers

The factory engineers of 108 automobile factories have investigated Stewart Speedometers and approved of them as standard or special equipment on their 1912 cars. Equipment contracts for 1913 cars are being placed with us in such numbers as to indicate that most cars using speedometers will be Stewart equipped, contracts won in competition with all other makers — won on the merit of the instrument.

The most accurate speedometer ever produced

STEWART SPEEDOMETERS ARE GUARANTEED FOR FIVE YEARS ***Send for Catalogue***

STEWART & CLARK MANUFACTURING COMPANY
1928 Diversey Boulevard, Chicago

Detroit, Chicago, San Francisco, New York, Boston, Cleveland, Philadelphia, Kansas City, Los Angeles, Minneapolis, Indianapolis, London, Paris

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"The Wise Distribution of Parts the Secret of Success."—*Bacon.*



The Dependable Kind—

Made in Germany

J. D. BRETZ COMPANY

SOLE IMPORTERS

F & S Ball Bearings

250 West Fifty-fourth, New York

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THE LONG HORN

Costs Little to Buy Costs Nothing to Operate Never Fails

THE LONG HORN is a perfect and positive mechanically operated gear-driven horn that can never fail to issue its warning note.

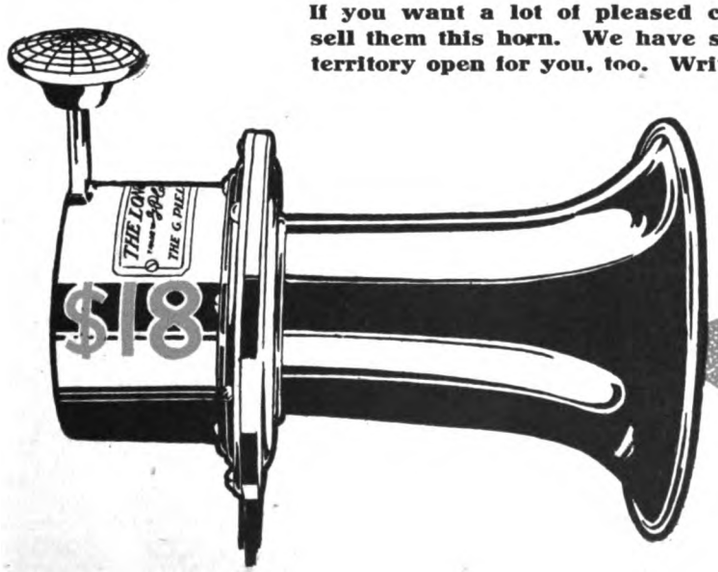
The Long Horn is not an electric horn—it is far and away the superior of any electric horn, yet it costs but about a third as much as the best electric horn.

The Long Horn is better than any other horn because,

It never fails to work.
There are no batteries to give out.
No wires to break.
No friction pulley to slip.
No bulb to rot.
No motor to fail to work.
No continued cost of upkeep.

All expense ends with the purchase of the Long Horn for all that is required in its operation is to "push the button."

If you want a lot of pleased customers sell them this horn. We have some real territory open for you, too. Write, today.



$ Dealers There's Money in This Horn for You

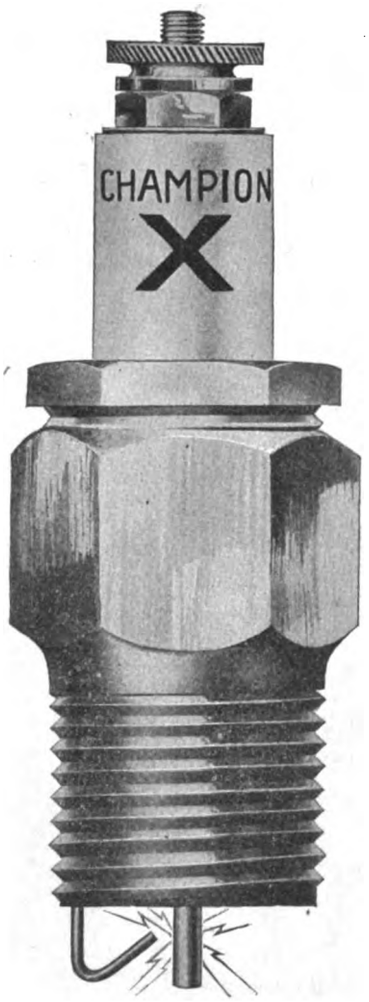
THE G. PIEL COMPANY
Long Island City NEW YORK

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CHAMPION

TRADE-MARK

Champion Spark Plugs



CHAMPION X
75 Cents

With 60 per cent. of the 200,000 cars manufactured in 1912 equipped with Champion Spark Plugs we are preparing for the enormous increase which is certain to follow in our business in 1913. Champions swept the field in the motor car year just closing. Individual motorists, dealers, manufacturers all willingly concede Champion superiority.

Merit comes into its own. It is the record of the most thoroughly dependable spark plug made whose fame increases directly as its quality becomes known. Get into the Champion ranks with the leaders.

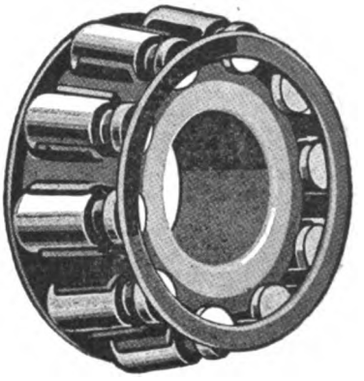
There are no old Chapmion plugs in dealers' stocks. Retailers who find a preference for one type are urged to exchange their others.

The best plug comes in a box bearing the "World" trade mark as shown above. Manufacturers and dealers write today concerning 1913.

Champion Spark Plug Co.

Dept C **TOLEDO, OHIO**

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THEIR unique principles won before their making was perfected.

Long before the manufacture of Timken Roller Bearings had reached anywhere near its present advanced state of perfection—

Long before Timken study and experience had developed the present analyses for steels and the present formulas for heat-treating the parts—

TIMKEN
TAPERED ROLLER BEARINGS
won marked success over all other types

Before there were any motor-cars, when horse-drawn vehicles ruled supreme—the Timken Roller Bearing proved its worth.

Crudely made as it was in those early days, yet its unique principles of design enabled it to give a service that no other bearing could give.

When the motor-car industry started it was our faith that the Timken Bearing would win the predominant place in the new service because of its wonderful efficiency due to principles of design.

The advantage of the line of contact of a roller over the point contact of a ball would enable it to support greater load, stand greater shocks, and, by evenly distributing the wear, would reduce it to the lowest limit.

The great Timken principle of tapered rollers revolving at an angle about a tapered cone with two ribs, would cause the bearing to meet "end thrust" as well as vertical load—and would enable wear to be taken up by adjustment without any loss of efficiency.

The foundations of our faith were sure. The experience of hundreds of thousands of motor-car owners has justified that faith.

And in the years during which Timken methods of manufacture have attained their present high state, our faith has become the faith of the great majority of the builders of pleasure and commercial cars.

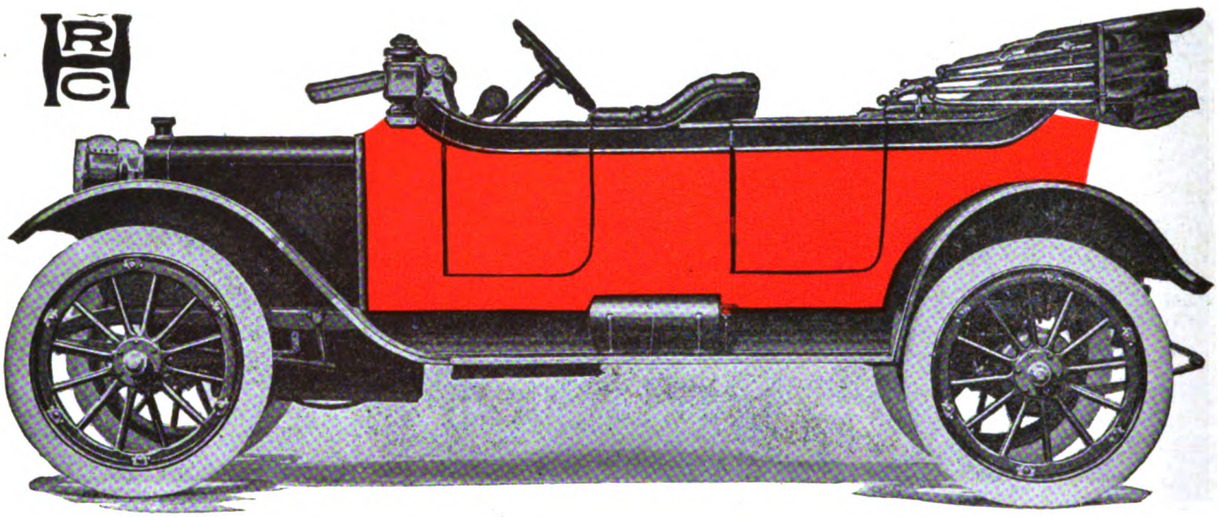
"The Companies Timken Keeps" is a booklet list of Timken users. It is almost a blue book of motor-car builders. Write for a copy today.

The Timken Roller Bearing Company
Canton, Ohio, U.S.A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company

110

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Model EE—5 Passenger Touring Car—110 Inch Wheelbase

R-C-H

"Twenty-Five"

TOURING CAR—Model EE

$900 F. O. B. DETROIT

32 x 3½ tires, demountable rims, extra rim, Bosch magneto, gas tank, windshield, lamps, horn, tools and kit; and the famous Jiffy Curtains, adjusted in an instant, making the car entirely weather proof. Long stroke motor, three speeds enclosed valves.

STANDARD MODEL

$850 F. O. B. DETROIT

Top, windshield, generator, Jiffy curtains, 5 lamps, horn, tools and tire repair kit, long stroke motor, three speeds, enclosed valves, Bosch magneto.

ROADSTER—Model EE

$750 F. O. B. DETROIT

Specifications and equipment same as Model EE Touring Car except that wheelbase is 86 inches.

STANDARD MODEL

$700 F. O. B. DETROIT

Specifications and equipment same as Standard Model Touring Car except that wheelbase is 86 inches. The Roadsters are roomy, comfortable and exceptionally easy to handle in narrow roads.

General R-C-H Specifications

Motor—4 cylinders, cast en bloc—3¼ inch bore, 5-inch stroke. Two-bearing crank shaft. Timing gears and valves enclosed. Three-point suspension. **Drive—Left-side.** Irreversible worm gear, 16-inch wheel. **Control—Center lever** operated through H plate, integral with universal joint housing just below. **Springs**—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats. **Frame**—Pressed steel channel. **Axles**—Front, I-Beam, drop-forged; rear, semi-floating type. **Body**—English type, extra wide seats. **Wheelbase**—110 inches. Full equipment quoted above.

IN a recent 3000-mile trip through the Middle West the writer met and talked with a number of automobile dealers, selling all makes of cars.

One of them—handling a car priced at well over a thousand dollars—made an illuminating remark. Said he: "I'm tired of explaining to people why my car is as good as the R-C-H—let alone better. I don't wish your man here any hard luck; but if he moves away or has a fortune left him, you can bet that next year I'll be in a position where the other fellow will have to do the apologizing."

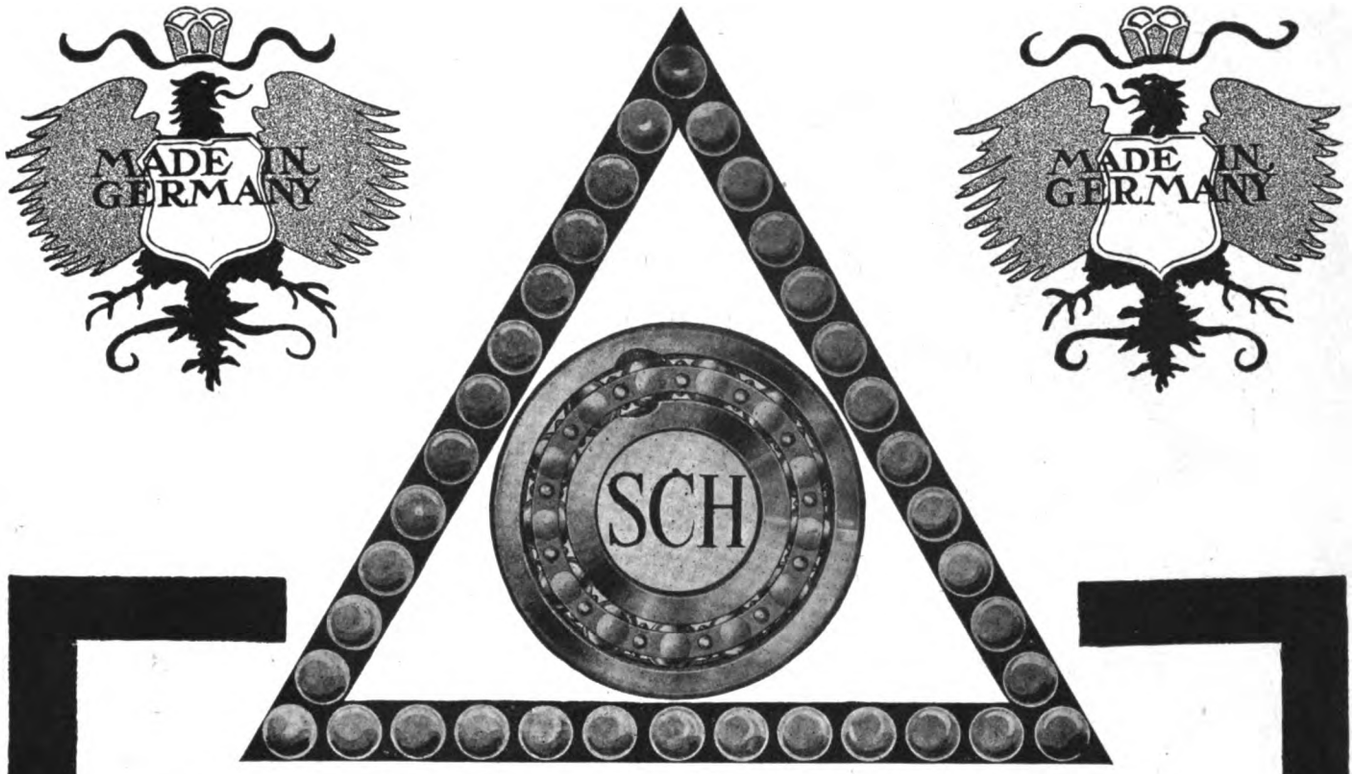
Our increased output for the coming season will enable us to make dealership arrangements with a number of additional dealers on "the greatest car for the greatest number."

And when you're handling the R-C-H, your sales work consists in showing the car, not in apologies or explanations. Suppose you write us, and see whether we can't get together.

R-C-H CORPORATION, 104 LYCASTE STREET Detroit, Michigan

BRANCHES—Atlanta, 548 Peachtree St.; Boston, 563 Boylston St.; Buffalo, 1225 Main St.; Chicago, 2021 Michigan Ave.; Cleveland, 2122 Euclid Ave.; Denver, 1520 Broadway; Minneapolis, 1206 Hennepin Ave.; New York, 1989 Broadway; Philadelphia, 330 No. Broad St.; Detroit, Woodward and Warren Aves.; Kansas City, 3501 Main St.; Los Angeles, 1242 S. Flower St.; Walkerville, Ontario, Canada.

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The Moving Weight and the Bearing Points

How much does your car weigh, loaded and fully equipped? Where does this weight fall?

The great load weighs down on the bearings, subjecting them to tremendous strains and stress. This attack is continuous—only the highest quality of bearings can "stand up" under it. Where ordinary bearings are used the enormous weight which moves over them induces rapid and costly deterioration. The effect is cumulative—friction induces undesired braking power for your engine to overcome. the flexibility of your car is lessened and a "rheumatic" condition obtains throughout the car mechanism. The entire performance of your car is affected by the conditions obtaining at the bearing points.

If there is any part of your car wherein you should use high grade equipment—wherein quality should be the first and last consideration regardless of cost—it is here.

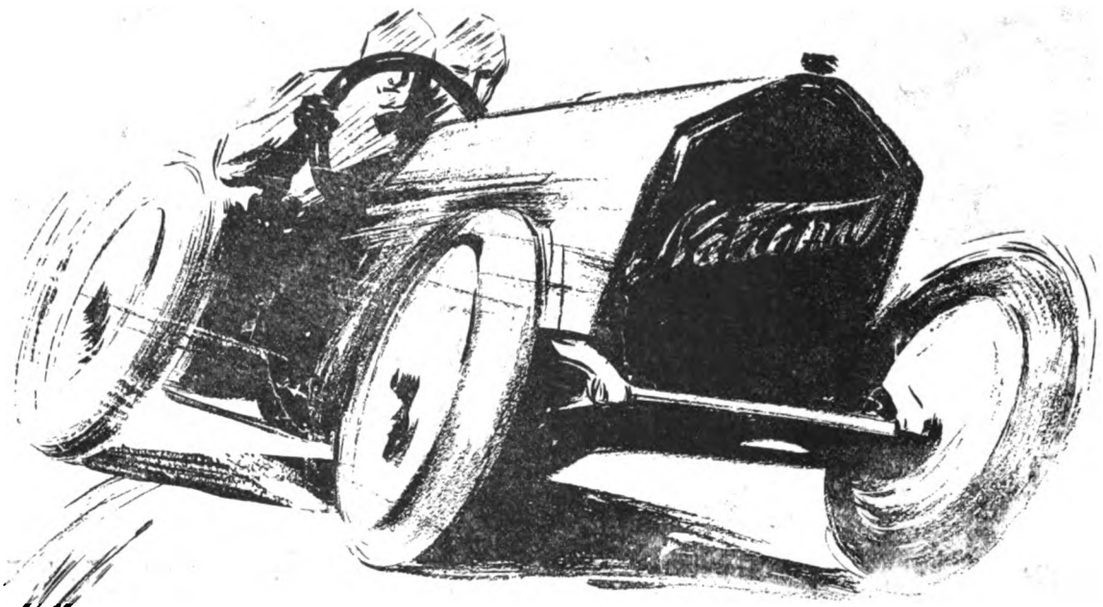
Schafer Ball Bearings are the highest grade and finest quality of anti-friction bearings made today. They are standard on high grade cars throughout the world. There is a reason for Schafer durability. The balls are uniform in size to within .0001 of an inch—this precision insures consistent and uniform carrying capacity. The material employed in their construction is an exclusive anaylsis Chrome Steel of extreme structural density and cohesive toughness. They resist wear and last indefinitely.

The use of Schafer Bearings insures the utmost smoothness of operation and freedom from frictional deterioration.

Barthel, Daly & Miller

42 BROADWAY Sole Importers NEW YORK CITY

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Joe Dawson in National car winning the 1912 500-mile Indianapolis Speedway Race.

Indianapolis 500-mile Race for the second successive year a victory for the

Truffault-Hartford SHOCK ABSORBER

Joe Dawson in a National car equipped with Truffault-Hartford Shock Absorbers finished first in the 1912 500-mile Indianapolis race in competition with the world's best cars and drivers. With this equipment only was it possible to maintain the tremendous speed-average of over 78 miles an hour.

It is significant that the first nine cars finishing were Truffault-Hartford equipped.

Car	Driver	Time	Shock Absorber	Car	Driver	Time	Shock Absorber
1—National	Dawson	6:21:06	Hartford	6—Stutz	Zengle	6:50:28	Hartford
2—Fiat	Tetzlaff	6:31:29	Hartford	7—White	Jenkins	6:52:38	Hartford
3—Mercer	Hughes	6:34:56	Hartford	8—Lozier	Horan	6:59:37	Hartford
4—Stutz	Merz	6:36:35	Hartford	9—National	Wilcox	7:11:30	Hartford
5—Schacht	Endicott	6:43:28	Hartford				

The winning National "Joe" Dawson up, made an average of 78.72 miles per hour for the 500 miles of the race.

The use of the Truffault-Hartford permits of maximum speed with minimum danger—a fact that explains its use by all of the leading professional drivers. It eliminates jolt, jar and vibration, saving car from excessive wear, tear and racking; is insurance against spring breakage; eases the strain on the tires by keeping them on the ground.

Indispensable for **comfortable motoring,** speed event, hill climb, endurance run, world tour, etc.

HARTFORD SUSPENSION COMPANY

EDW. V. HARTFORD, President

Main Office and Factories: 164 Bay Street, Jersey City, N. J.

BRANCHES:

NEW YORK—1700 Broadway.
NEW YORK—212-214 West 88th Street
JERSEY CITY—141-143 Morgan Street
BOSTON—319-325 Columbus Ave.
CHICAGO—1458 Michigan Ave.
DETROIT—803 Woodward Ave.
KANSAS CITY—1524 Grand Ave.
NEWARK—289 Halsey Street
PHILADELPHIA—1437 Vine Street

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Marion

A Word About Reorganization

THE recent reorganization of the Marion Motor Car Company makes possible a far broader and larger program of manufacturing, sales and service expansion than this famous concern has ever before enjoyed. The organization as it now stands will be one of the industry's big and important factors. The capital has been greatly increased. The annual output will be more than doubled. Additional plants are already under way. Facilities on all sides are being enlarged and made more complete. Several of the industry's best known men are to direct the many progressive and permanent plans; in fact, the entire executive staff is composed of men who stand exceptionally high in automobile circles. For over eight years the Marion Car has made a phenomenal record.

There has never been a year when the supply was as great as the demand. Its thousands of owners will tell you of a satisfaction that is unique in its completeness. Pick out among your acquaintances, a Marion owner. He will tell you of its unusual merit and efficiency. You never heard a Marion owner complain.

The Marion is distinctly a family car. It is serviceable, safe and comfortable. It is big, powerful and beautiful. It is sound to the core. Here is the full line. Our dealer will gladly give you a thorough demonstration.

Catalogue on request.

Model "Thirty-Seven", $1,350

Five-passenger, fore-door Touring; Forty horsepower; motor 4 x 5; wheel base 112 in.; tires, 34x4, quick detachable. Equipment as follows:

Fine mohair top and curtains; fine mohair and rubber top boot; $50 Warner Speedometer; genuine plate glass wind shield; Prest-o-lite self-starter; Prest-o-lite tank; full set five (5) lamps; full set tools, repair kit, etc.

Model "Forty-Eight", $1,750

Five-passenger, fore-door touring; forty-five horsepower; motor, 4½x5½; wheel base 120 inches; tires, 36 x 4 quick detachable; nickel trimmings throughout. Equipment as follows:

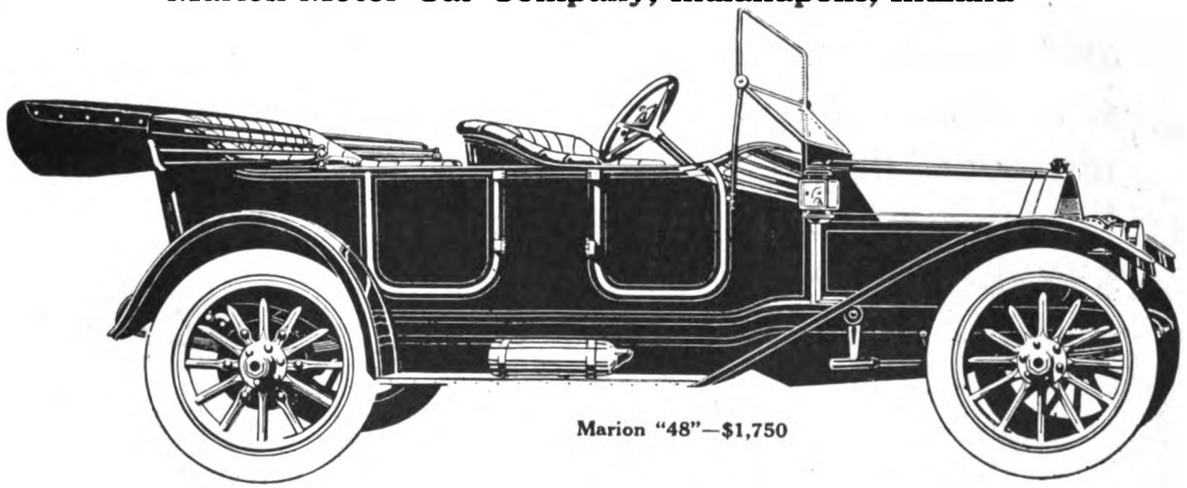
Fine mohair top and curtains; fine mohair and rubber top boot; Zigzag plate glass wind shield; $50 Warner speedometer; Prest-o-lite self-starter; Prest-o-lite tank; full set five (5) lamps; full set tools, repair kit, etc.

"Bobcat" Roadster (Model Thirty-Six) $1350

Two passenger Roadster; forty horsepower; motor, 4x5; wheel base 112 in.; tires 34x4, quick detachable. Equipment as follows:

Fine mohair top and curtains; fine mohair top boot; rubber driving apron rolled on dash; $50 Warner speedometer; Prest-o-lite self-starter; Prest-o-lite tank; full set five (5) lamps; full set tools, repair kit, etc.

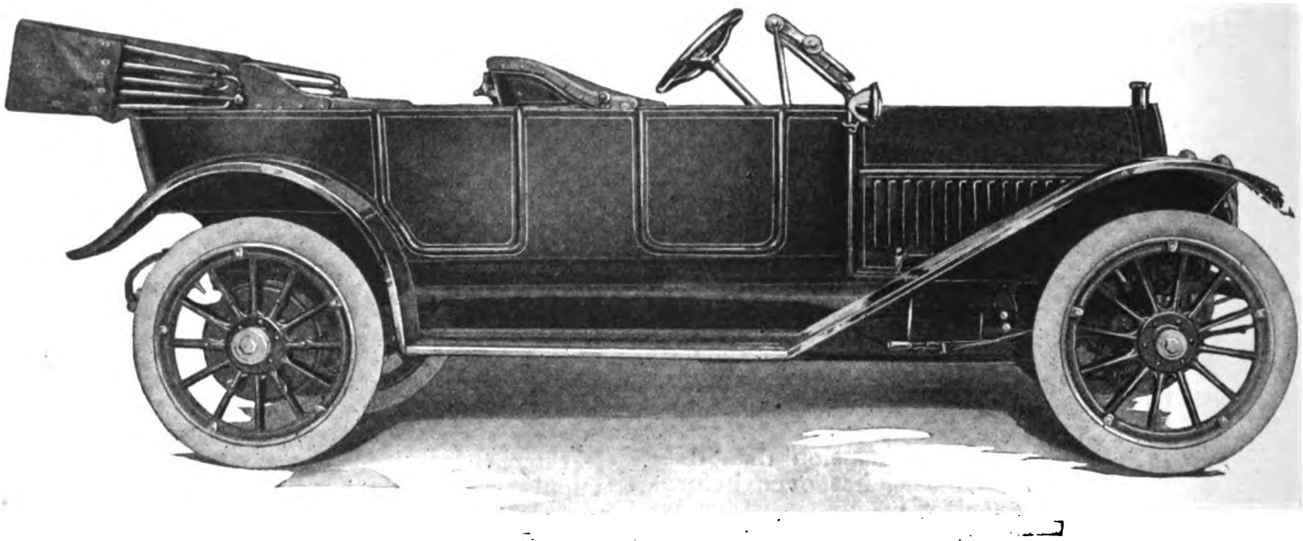
Marion Motor Car Company, Indianapolis, Indiana



Marion "48"—$1,750

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Grant Six



THE GRANT SIX is the Pioneer Semi-Assembled Car—it is the one and only standardized car on the market. It is the only car built that is doubly guaranteed—first by the part builders and second by the plant that assembles these specialized parts, each the product of a specialist, into one first quality car. Compare the Grant Six part by part with any car built costing over $3500—in every detail you will find that the better car is the Grant Six **$2750**

The Grant Motor Car Company
2364 East 69th Street

Cleveland Ohio U.S.A.

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Grant Six

A Motor Car Proclamation

"I defy any automobile manufacturer on the market to show a car with a combination of essentials equal to the 'GRANT SIX.'"—*Harry H. Elmer.*

This challenge is without price restrictions.

We proclaim the "GRANT SIX" the only standardized car in the world today. We are the first and only manufacturer to build a motor car entirely of parts made by recognized standard makers.

Here is the list of specialists who contribute to the construction of the "GRANT SIX." Read their advertisements on the pages indicated.

Wisconsin Motor Mfg. Co.....Motor
Timken-Detroit Axle Co.....Axles
Timken Roller Bearing Co.....Roller Bearings
(See their ad. on page 15)
Cleveland-Canton Spring Co.....Springs
Hydraulic Pressed Steel Co.....Frame
Detroit Carriage Company.....Body
Grant-Lees Machine Company.....Transmission
Grant-Lees Machine Company.....Clutch
(See their ad. on page 64)
Fedders Manufacturing Co.....Radiator
(See their ad. on page 77)
Hayes Wheel Company.....Wheels
Gemmer Manufacturing Co.....Steering Gear
(See their ad. on page 22)
Wyman-Gordon Drop Forge Co.....Forgings
Diamond Rubber Co.....Tires
(See their ad. on page 65)
Marvel Carburetor Co.....Carburetor
Standard Welding Co.....Exhaust Tubes
Hartford Auto Parts Co.....Universal Joints
(See their ad. on page 1)

W. A. & J. C. Haartz, Importers.....Top Material
Eisemann Magneto Co.....Magneto
Gray & Davis Lamp Co.....Lamps
(See their ad. on Front Cover)
Warner Instrument Co.....Speedometer
(See their ad. on page 68)
Superior Manufacturing Co.....Wind Shields
Valentine & Company.....Paint
Murphy Varnish Co.....Varnish
Cincinnati Ball Crank Co.....Drag Links
Crandall, Stone Company.....Bow Sockets
Union Bow Company.....Bow
Jos. N. Smith & Co.....Mouldings
Imperial Brass Co.....Gasoline Valves
Atwood Brass Mfg. Co.....Coat and Foot Rails
Michigan Steel Casting Co.....Steel Castings
J. S. Bretz Company.....F. & S. Bearings
(See their ad. on page 12)
The Esterline Company.....Lighting
The Otto Konigslow Mfg. Co.....Controls

We invite you to write to any of the above manufacturers as to the quality and grade of the parts or materials furnished us. Can any Jack-of-all-trades shop do this?

Our new and enlarged folder describes the car in detail. Sent free by return mail. Write today.

DEALERS: Write for this folder and our special territorial proposition AT ONCE.

The Grant Motor Car Company
2364 East 69th Street

Cleveland Motor Cars

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GEMMER
STEERING GEARS

History Repeats Itself

Why? **A National Car,** driven by **Dawson,** won the fastest Five Hundred Mile International Sweepstakes Race ever run. Time, 6:21:06. Average speed, 79 miles per hour. **The car was piloted by a GEMMER STEERING GEAR.**

Nine American cars placed; **SIX equipped with GEMMER STEERING GEARS:** 1st—National; 3d—Stutz; 5th—Schacht; 6th—Stutz; 9th—National; 10th—Knox.

Marmon's Wasp, driven by **Harroun,** won the first International Race. It was piloted by a **GEMMER STEERING GEAR.**

Eight American cars competing in 1911 were awarded prizes. FIVE were equipped with **GEMMER STEERING GEARS:** 1st—Marmon; 5th—Marmon; 7th—National; 8th—Amplex; 9th—Knox.

Considerably over **one hundred** representative automobile manufacturers are using **GEMMER STEERING GEARS** exclusively on their cars.

Please bear in mind that successful manufacturing does not come by chance or good luck. There is always a substantial well-defined reason. Those who use **GEMMER STEERING GEARS** are familiar with this reason. They know why **GEMMER STEERING GEARS** are a part of standard equipment—equipment which no one questions, and which is the last word with the distributor and the public.

GEMMER service, quality, and reputation are at your command.

Write for a complete tabulated wall hanger of the race.

Address Department D

GEMMER MANUFACTURING COMPANY

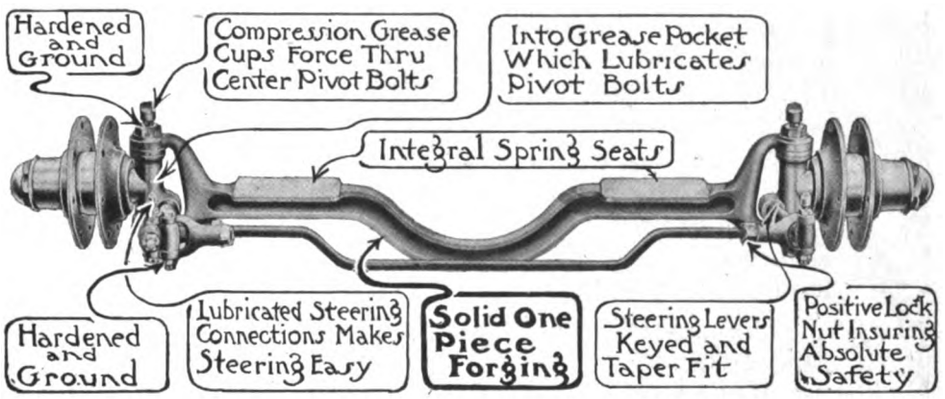
DETROIT, MICHIGAN

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EXPERIENCE — SHELDON — RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL

"Made in the Largest Axle Factory in the World"

Axle Talk—No. VI



The initial strength of a single piece of steel is immeasurably greater than that of several separate sections, no matter how skillfully they may be welded into an integer.

The SHELDON Front Axle, shown here, is a single drop forging, every detail of which is stamped into shape by especially devised forge hammers.

Note that even the spring seats are part of the original steel—that from knuckle bearings to knuckle bearings not a single detail has been "glued on."

Aside from other acknowledged points of superiority, you will do well now to consider and act upon this one feature of vital import—the conservation of load, shock and side thrust resistance.

SHELDON Axles give "100 per cent plus" service in this particular alone. They acknowledge no peer in any detail of material, design and construction.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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Overland

OUR MODEL 60 has proven the undisputed bargain in the industry to date. Many automobiles have won brief popularity, but month after month we have been unable to make enough Model Sixties to fill orders.

Manufacturers and salesmen have hurled arguments against it, based on design, new features, economy of operation and a score of other pointless points. The Model 60 could not be denied. You can only beat value with value.

The Overland Model 60 sells for $1200. This has been, virtually, the sole argument of Overland dealers. Why pay more, when you are privileged to reduce the cost of your car through mammoth Overland production?

The power, speed, silence and comfort of the Model 60 will cost $1500 in any other line. It will pay you to write us at once.

Ask for book I-46.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, June 13, 1912. No. 12

TO CONTINUE THE SIMMS MAGNETO

Sudden and Unexpected Turn in its Affairs —Stoddard and Edwards Identified with New Ownership.

Contrary to all indications, the Simms Magneto Co. will not only continue to manufacture magnetos in America but shortly will put its big plant in Bloomfield, N. J., into full operation for the first time, and two men, well known in the industry, but who heretofore have been identified wholly with the manufacture of cars, will become identified with the Simms organization. They are none other than C. G. Stoddard and H. J. Edwards, who several months since retired from the United States Motor Co. to organize an enterprise of their own for the production of Knight-engined automobiles.

These arrangements, which carry with them a practical reorganization of the Simms Magneto Co., are so far advanced that the final details will be perfected before the end of the present week. They grow out of the sale of the Simms plant, which briefly was reported in the Motor World last week. Since it was built it never has been fully operated, and for several months has been at a standstill. It finally was placed on the market, and at one time or another three different magneto manufacturers have considered its purchase. It generally was understood that one of them had about reached the purchasing point, when last week the affairs of the Simms company itself took the present unexpected turn. Most of the men responsible for the change in the situation and who purchased the controlling interest in the Simms company are identified with the $10,000,000 Assets Realization Co., of 25 Broad street, New York City, at least one of whom is also an official of the Simms company.

At a meeting of the Simms stockholders which will occur this afternoon it is probable that the old company will be liquidated and replaced by a new corporation backed with ample capital. President Simms, who resides in England, where the original Simms company is located, in all likelihood will retire and be succeeded by C. G. Stoddard. In any event, Stoddard and his colleague, Edwards, will assume the active management of the plant. They both have acquired stock in the Simms company, and despite their activity in that direction, it will in no way interfere with the formation of the Edwards Motor Car Co., which is to manufacture Knight-engined vehicles, which at last is near to becoming a reality.

The Simms plant in Bloomfield as it now stands is completely equipped with the most modern automatic machinery, and it is the intention of the new owners to operate it to its full capacity, which approximates 100,000 magnetos a year.

Wyckoff Reorganization Awaits Partridge.

Reorganization of Wyckoff, Church & Partridge, Inc., of New York, which is to relieve the pressure which originally caused the friendly proceedings which resulted in the appointment of a receiver on March 12th last, is little, if any, nearer consummation now than it was several weeks ago, according to statements made by Clarence F. Wyckoff, president of the company. It is known, however, that at the present time Vice-President E. S. Partridge is in Europe in connection with the affairs of the company, and his efforts are expected to have a material bearing on the ultimate plans that are adopted. He will not return for a week or 10 days, however, and in the meantime things practically are at a standstill.

Upheaval in "U. S. Motors" Shares.

Violent disturbances in the value of the United States Motor Co.'s shares in the markets of New York and Chicago have marked the past week. During the period, the preferred dropped from 27 to 12 and the common from 9⅛ to 4. The upheaval brought about the failure of one New York broker and has given rise to reports of radical reorganization or refinancing of the big company, among other things.

ASSERTS RIGHT TO "CLINCHER"

British Tire Manufacturer Lays Claim to Long-Used Word—Issues Warning Aimed at American Exporters.

Although the term "clincher," as applied to tires, has been in almost universal use for many years, it now appears that the North British Rubber Co., of London, claims the exclusive right to the use of the word. In fact, it not only claims the right to the word, which it has registered as a trade name, but has issued a warning that its unauthorized use will bring legal action.

The sudden activity of the company, apparently, grows out of the increasing exportation of American tires, both separately and affixed to American cars, the warning being specially directed at importers "of certain motor cars or chassis brought into this country fitted with pneumatic tires and impressed or marked with the name clincher." The attorneys for the North British Rubber Co. declare that in each case discovered steps have been taken to prevent the use in Great Britain "of these improperly marked tires," and add that "immediate proceedings will be commenced against any person or persons importing, dealing in, using or being found in possession of such tires."

Small Accounts Cause Foote's Failure.

D. E. Foote, doing business as the D. E. Foote Rubber Co., at 1901-1905 Euclid avenue, Cleveland, O., filed a voluntary petition in bankruptcy on Monday last, 12th inst. S. L. Berman has been appointed a receiver and is now in charge. According to his petition, Foote, who cut a considerable figure in the automobile accessory trade in his vicinity, has liabiilties of $547,735.54 and nominal assets of $34,739.32, the latter consisting chiefly of automobile supplies to the value of $16,000 and several hundred small accounts, aggregating $18,108, which latter assisted in bringing about his embarrassment.

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SPARK PLUG ARGUMENT IS HEARD

Federal Court Now Has Canfield Patent Under Consideration—If Sustained, All Makers Will be Affected.

Whether the famous Canfield patent, No. 612,701, dated October 18, 1898, controls the spark plug situation, as its owners, A. R. Mosler & Co., of New York, believe, probably will be made known in the course of the next few weeks, the suit of Mosler & Co. vs. John Lurie, trading as the Automatic Supply Co., of New York City, having been heard by Judge Mayer in the United States District Court for the Southern District of New York on Monday and Tuesday of this week. The argument occupied all of both days, and Judge Mayer now has the case under advisement. While it is not a part of the record, Lurie himself did not undertake the defense. He was represented by counsel acting for the Rajah Auto Supply Co. and C. A. Mezger & Co.

The Canfield patent is claimed to cover all spark plugs having a deep recess around the electrode, which means substantially every plug that now is manufactured, or has been manufactured for many years, which claim serves to illustrate the importance and far-reaching nature of the litigation. The patent was at one time owned by the Association of Licensed Automobile Manufacturers, but several years since was sold to Mosler & Co., with reservations, protecting the A. L. A. M. members.

Car of Mystery Coming from Oklahoma.

W. E. Nation, who is described as "the proprietor of the largest retail harness and vehicle business between Kansas City and the Gulf of Mexico," is making ready to engage in the manufacture of motor vehicles, his plans already being so far advanced that it is stated his factory in Oklahoma City will be in operation within ninety days. It will be located on Tena avenue, in what is termed the Exchange addition to Oklahoma City, and will be 100x120 feet and afford 12,000 square feet of floor space.

Mystery partly surrounds the vehicles which Nation will product. He will manufacture both cars and trucks, but, according to local announcements, behind it is "something even greater and more inspiring than the project itself." The "something" is "a new development that works for efficiency and economy" and "which ultimately, doubtless, will revolutionize the automobile manufacturing business of the world." "Until he holds in his hands the official patent both for its manufacture and the manufacture of the machinery by which it is made," the Oklahoma man, however, will keep the secret locked in his chest. It is declared, however, that his vehicle will be "a typical Oklahoma machine." According to the local prophets, "the ideal swamp land machine has come and so has the ideal mountain type, but a machine suited for the mixed prairie formation of Oklahoma and much of the Southwest still is lacking," and apparently it is Nation's intention to supply that "long felt want."

Garage Sues State for $15,000 Damages.

Because that portion of the Boston Post Road on which it is located has been in a state of repair, or similar disruption, for a year or more, the Mutual Garage, Inc., of Greenwich, Conn., has instituted suit against the State of Connecticut for $15,000 damages, alleging that its business has been practically ruined by dereliction on the part of the state highway commissioners. The Mutual Garage is the outgrowth of a more or less co-operative plan on the part of a number of Greenwich physicians, who were its principal patrons, and the disgraceful condition of the road, of course interfered with their ingress and egress to and from the garage, and diminished receipts from transients.

Alco Floats $3,600,000 Note Issue.

Following the procedure adopted by so many of the big companies identified with the automobile trade, the directors of the American Locomotive Co. have authorized a 5 per cent. gold note issue to the amount of $6,000,000, of which $3,600,000 has been issued and underwritten. The issue comprises three series of $1,200,000 each, due respectively July 1, 1915, 1916 and 1917. The notes are offered for sale at $100 and accrued interest, and are redeemable at the option of the company at any interest date at 102 and interest. The notes are a direct obligation by the company, and while not secured by mortgage, no lien can be placed on any of the company's property during their life, unless money has been deposited in trust for the payment thereof.

De Tamble Asks for Change of Venue.

Further increasing the troubles of the De Tamble Motors Co., of Anderson, Ind., another petition to place it in the hands of a receiver has been added to the one which two weeks since was filed in the Indiana Superior Court by the U. S. Ball Bearing Mfg. Co., of Chicago. The second petiton was filed in the same court by the Sheldon Axle Co., Indianapolis, on Friday last. At the hearing, the De Tamble Motors Co. filed a motion for a change of venue from Madison county, but the court has not yet ruled on the motion.

Michelin Again Reduces Tire Prices.

The Michelin Tire Co., which reduced its prices in February last, has made a further reduction. On the more popular sizes, 34 x 4, 36 x 4½ and 37 x 5, the new prices are $33.25, $43.75 and $54, respectively, which compares with the former lists of $35.75, $47.25 and $58.75. The Michelin new prices are approximately from $2 to $6 higher than the recently revised lists of the United States, Goodrich, Goodyear and other companies.

SUES SIMMS FOR BROKEN CONTRACT

Former "Sole Sales Agent" in America Claims $15,652 Owing Him—Commissions and Other Items.

Because Albert R. Miller, after a brief career as "sole sales representative in the United States of America" for Simms magnetos, was dismissed and, as he claims, his contract broken while commissions and other money was owing him, he assigned his grievance, valued at $15,652.25, to one Erwin H. Smith, of 135 Hamilton place, New York City, who has brought action in United States District Court for the Southern District of New York.

The action is directed as against the Simms Mfg. Co., Ltd., which was the title of the English company, but in all documents presented by the defense the defendant is named as the "Simms Magneto Co., Ltd., which is being sued as the Simms Mfg. Co., Ltd.," thus adding the matter of speculation as to whether the action has been brought against the proper concern.

The Miller-Erwin side of the case is that in January, 1909, Miller made an agreement and several months later signed a contract whereby, under various conditions, he was to represent the Simms company in the United States for three years, his commissions on sales to be 5 per cent.; that he sold $52,040.38 worth of magnetos between February 1, 1909, and January 1, 1910, and then was informed by the president of the company that he was dismissed as "sole sales representative" in America. He claims his rightful commissions amounted to $2,602.02, of which only $201.75 was paid. The amount of his claim is made up as follows: Services for term employed, $8,000; advertising, $2,814; traveling expenses, $3,915; printing and stationery, $200; secretary and stenographer, $800; storage of magnetos, $125.

The action first was commenced in Supreme Court for New York county, but has been transferred to the federal court. In one document on file the Simms company states it was incorporated in England October 3, 1907, as the Simms Mfg. Co., Ltd., but that February 16, 1910, the name was changed to Simms Magneto Co., Ltd. The latter part of the contract states that it is made in London and subject to English law. By the contract Miller was to pay most of the expenses of his agency until the Simms company should establish a New York office of its own. In the event of the company being incorporated in the United States, Miller was to be given the "premier consideration for the position of sales manager at a salary and commissions to be mutually agreed upon," but under no consideration was Miller to sell Simms magnetos as "Bosch" or "Simms-Bosch," as the Simms instrument once was styled and sold.

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KLAXON-MILLER SUIT DISCONTINUED

After Lining up for the Battle, Complaint is Withdrawn—Both Sides Claim the "Honors of War."

What promised to be a long-drawn-out and strenuous legal battle flickered out late last week, when the application made in United States District Court for the Southern District of New York by the Lovell-McConnell Mfg. Co. for a preliminary injunction restraining Charles E Miller, the well known New York supply man, from dealing in Klaxon horns was withdrawn by the complainant and the case was dismissed without prejudice. Miller is handling the Newtone horn, which, it is claimed by the Klaxon makers, infringes the Klaxon patents, Nos. 923,048, 923,049 and 923,122, and the Klaxon people therefore objected to Miller's handling both horns, which, it was charged, was a violation of the conditional license attaching to the sale of all Klaxons, a suit for infringement against the makers of the Newtone being on the docket.

Before the action against him was instituted, Miller and the Lovell-McConnell company had engaged in extended correspondence, which reached the heated stage. Under the circumstances, Miller declared he had no desire to continue the sale of Klaxons, but as he had some of them on hand, he was left in quite a quandary until the Lovell-McConnell people repurchased them.

Since the litigation was discontinued, however, each side claims to have forced the other's hand.

George C. Dean, the Klaxon counsel, expresses it in this wise: "In the present case the defendant, after receipt of the final notice and before the motion came to hearing, made answering affidavit declaring his intention to wholly discontinue all business in Klaxons, and, accordingly, when the motion to compel him to do this came up for hearing on Friday, June 7, 1912, the motion was withdrawn, but only for the present and without prejudice to its renewal in case the defendant should ever again attempt to sell Klaxons."

On the contrary, Arthur W. Weil, Miller's attorney, declares that the advantage and "honors of war" rest with Miller. "It was not until after the Lovell-McConnell Mfg. Co. unsuccessfully had endeavored to get our consent to the entry of an order stating that it was because Mr. Miller had entirely complied with all the requirements and desires of the Lovell-McConnell company that they withdrew the motion for an injunction. But Mr. Miller's attorneys declined to sign, because that would have made it appear that that company was terminating business relations with Mr. Miller, when precisely the contrary was the fact. It was when we stated that we were ready to argue the motion for an injunction that the Lovell-McConnell company voluntarily withdrew its motion for an injunction in open court."

Willys Makes Public His Huge Plans.

Undisturbed by rumors linking his name with projected mergers, invitations to join several of which at various times have been more or less respectfully declined, John N. Willys, president and owner of the Willys-Overland Co., of Toledo, O., has pursued the even tenor of his way, mapping out plans that are all his own. They took shape early this week, when it was made known that the capital of the Willys company will be increased from $6,000,000 to $15,000,000, and that the Overland factory in Toledo will be doubled in size to permit of an output of 40,000 cars during 1913, which, it is stated, will include a lower priced runabout than is now produced and possibly an electric vehicle. When the capital is increased, the stock will be made up of $5,000,000 7 per cent. preferred and $10,000,000 common. The preferred will be offered for public subscription but Willys and his immediate associates will retain all of the common. The building plans include the erection of a three-story structure, 700 x 100 feet, one of two stories, 200 x 70 feet, and a third one, 300 x 100 feet.

Stromberg-Flechter Case Withdrawn.

For reasons that do not appear, when the suit of the Stromberg Motor Devices Co., of Chicago, against L. V. Flechter & Co., of New York City, for alleged infringement of the Goldberg carburetter patent, No. 928,042, was reached in United States District Court for the Southern District of New York this week the complaint was dismissed with the consent of both parties, with costs. Judge Hand, who signed the order of dismissal, had only about a week previously executed an order upon application of the Flechter attorneys directing the case to be tried in open court, which in legal circles was regarded as an indication that the Flechter side considered its case uncommonly secure, as this procedure is seldom followed otherwise.

To Build Bodies in "Old Virginia."

The Richmond Vehicle Construction Co. has been organized in Richmond, Va., and will take over the business formerly conducted by W. C. Smith at 114 North Broad street. Its title, however, is somewhat misleading, in that the company will produce only vehicle bodies and not the vehicles themselves. The officers of the company are John A. Self, president; Thomas H. Marsh, vic-president, and John H. Smith, secretary and treasurer.

Chadwick to Leave Pottstown for Reading.

According to advices from Reading, Pa., the Chadwick Engineering Works, maker of the Chadwick car, is preparing to remove from Pottstown, Pa., to Reading. It is stated that a large plant now is being erected for its occupancy.

HIGHER COURT UPHOLDS WEED GRIP

Atlas Appeal Denied in Sweeping Decision Repeating Refusal to Limit Parsons Patent—Weed Impregnable.

Repeating what other courts have held, i. e., that the Parsons patent, No. 723,299, covering the well-known Weed chain tire grip, applies to a "useful and meritorious invention," the United States Circuit Court of Appeals for the Second Circuit, on Thursday last, 7th inst., denied the appeal filed by the Atlas Chain Co., of Brooklyn, N. Y., and thereby sustained the injunction granted by the court below, in which the proceedings, of course, were instituted by the Weed Chain Tire Grip Co., of New York.

The appeal was heard by Judges Coxe, Noyes and Hough, the opinion being written by Judge Coxe. It is of a far reaching character, and as it is the first of the many cases tried within the territory of the Second Circuit to reach the Court of Appeals, it practically operates to make the Weed position impregnable in this part of the country in respect to "creeping," "anchored" and all other forms of tire chains, since the only further step that is open is appeal to the Supreme Court of the United States, which it is highly improbable will be taken.

"It is probable that the genius of the inventor will yet devise a more simple and efficient method of preventing the skidding of rubber tired vehicles," declared Judge Coxe in his opinion dismissing the Atlas appeal, "but so far as the art has developed Parsons appears to have been the first to provide means which minimizes the greatest danger which confronts the traveler in such vehicles."

Flouting the old Thomson patent, which had been brought to bear as an anticipation and in sustaining the patent, Judge Coxe said:

"In such circumstances, it is the duty of the court to place upon the claims a construction commensurate with the invention. It is said that the words, 'fitting loosely over the periphery of the wheel' in the description and the words 'free to move or shift its position around the periphery thereof' in the claims, require a construction that the cross chains shall be so loose that they must necessarily hang in loops from the supporting wires and be successively laid down upon the ground immediately in front of the tread of the tire. There is nothing in the prior art requiring such a construction, and, if adopted by the court, it will enable any chauffeur who has wit enough to contract the circumferential support so that the cross chains are drawn more tightly across the tire, to evade the patent with impunity. 'Loosely' is here used in contradistinction to 'tightly' and means that the cross chains must be sufficiently loose to secure the advantages of

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the invention, viz., to creep and not pound the road as they would do if rigidly fastened to the wheel when traveling at a high rate of speed.

"That the defendant's grip creeps is expressly admitted, as is also the contention that if by use the cross chains become loose so that they are free to move or shift their position around the periphery of the wheel, the device becomes an infringement. It is also clear that the defendant's device may be so adjusted that the chains are held loosely, and if the driver of the car becomes satisfied that the best results can only be attained by a loose adjustment, it is more than probable that he will adopt that method. In other words, the defendant places in the hands of the chauffeur an apparatus which may infringe or not, according to whether it is wound up loosely or tightly. Should it appear that the best results can be obtained only by a loose adjustment, it is hardly probable that the chauffeur will take the additional time and trouble to secure an inferior result. If experience shows that a loose adjustment prevents skidding and saves the wear and tear of the tires, it is safe to assume that it will be adopted, notwithstanding directions to the contrary. When the defendant sells a device the natural, usual and preferential use of which constitutes an infringement, it is no answer to assert that it is possible, by limiting its efficiency, to use it innocently.

"We cannot avoid the conclusion that the changes made by the defendant are attempts to secure the fruits of Parsons's invention by alterations in non-essential details.

"The history of the protracted litigations shows that, with few exceptions, the courts have regarded the Parsons invention as a meritorious one and have given it a construction sufficiently liberal to include all changes of form which accomplish the same result in substantially the same way.

"The defendant was practically selling the patented grip in all its essential details, but in addition, it provided tension springs with directions to make a tight fitting grip. These springs may or may not be used, and the directions may or may not be followed, but even if they are followed, the same result is obtained, only in a less degree; the circumferential creeping of the cross chains is not so marked. Believing the invention to be a meritorious one, we decline so to limit the claims as practically to invalidate the patent. The order is affirmed."

Dorian Rim Assets Are Disclosed.

Schedules in bankruptcy of the Dorian Remountable Rim Co., of New York, which were filed this week, show liabilities of $176,584 and nominal assets of $213,937, consisting of stock, $48,513; four automobiles, $6,845; machinery, $21,222; patents, $104,409; office furniture, $2,621; accounts, $30,227; insurance, $20, and cash in bank, $80. The chief creditor is M. Rositt, the banker, whose failure enmeshed Dorian.

ONE NAME COVERED TWO CONCERNS

Corporation and Co-Partnership Found to Have Same Title—Renault Suit Discloses Remarkable Situation.

The remarkable situation of two separate business organizations, each having the same name and containing the same men, the one being a corporation and the other a co-partnership, was disclosed by a suit argued late last week in the Appellate Division of Supreme Court for New York county, wherein the Renault Freres Selling Branch sought to recover from Sewall & Alden, New York, insurance brokers, the amount of a bill for repairs made to the automobile of one Schuyler V. C. Hamilton, whose car, insured by the defendants, had been damaged in an accident. The lower court awarded damages of $2,051.88, whereupon the brokers appealed.

The advantages, or disadvantages, of the dual existence of Sewall & Alden were suggested when Henry F. Sewall, president of the corporation, said the corporation, which was the organization being sued, was not the agent for the General Accident, Fire and Life Assurance Corporation of Perth, Scotland, and maintained that if the complainants had any claim against the agents of the insurance company's representatives, the co-partnership of Sewall & Alden was the representative.

The Renault argument tending to dispose of this claim was that after the car was damaged a representative of Sewall & Alden, who had represented them in previous similar cases, negotiated for the repair of the car, and an estimate of the repairs was sent to Sewall & Alden and was returned marked "Estimate accepted by this company," the word "company" referring essentially to a corporation.

The principal defense in the action was that the bill should have been charged against Hamilton himself, but the negotiations between the Renault Branch and the insurance men served to secure a verdict in the lower court, and decision of the Appellate Division is pending.

Sued for $4,250, Asks for $22,000.

Claims and counterclaims appear in an action now near trial in New York City Court, wherein the White Co., of Cleveland, O., maker of White cars, is suing the White Motor Co., its former Brooklyn (N. Y.) dealer, and Philip S. Saitta, an attorney, on two promissory notes of $3,625 and $625, respectively. Saitta is named as endorser. The mix-up grew out of a contract made between the two organizations whereby the defendant was to sell White cars in Brooklyn, but the manufacturing company claims the contract was disregarded by the dealer and broken. In answer the defendant this week set up a denial and counterclaim for $22,000, claiming this amount for commissions on cars sold; but inasmuch as the White Co.'s books recorded no such commissions the judge, upon request, directed the defendant to file a bill of particulars showing the basis for the claim. In case the defendants have not information sufficient to produce the bill they are directed to make affidavit to that effect.

General Motors Moves Truck Office.

In order to permit of closer co-operation between the sales and manufacturing departments of the General Motors Truck Co., the executive offices of the company, which heretofore have been located in Detroit, will be removed on the 17th inst. from that city to the company's factory in Pontiac, Mich., where the lighter gasolene trucks and the electric trucks are manufactured. The present offices in Detroit will be retained as a branch, and will be removed to the service building which now is in course of construction at 12th street, Lafayette boulevard and Fort street. The change in location of the executive offices presages no change in the factory organizations at Owosso or Pontiac, which will remain as heretofore.

Veitch Stock That is Minus Par Value.

The Veitch Motor Mfg. Co., which is to manufacture parts, and ultimately build complete cars, in Dayton, O., the formation of which was noted in last week's Motor World, was this week incorporated under the laws of New York with capital stock of $2,000, of which one-half is preferred $100 shares; the common will have no par value—which is permissible under a new law. The directors named are James S. Harris and Percival J. McIntosh, of New York, and Charles H. Toy, of Brooklyn. At the same time, the Veitch Securities Co. also was incorporated, with capital stock of the same amount.

Goodyear's New Stock is Authorized.

As was expected, the stockholders of the Goodyear Tire & Rubber Co., of Akron, O., have ratified the proposed increase in capital stock from $6,000,000 to $15,000,000, representing an issue of $4,000,000 in 7 per cent. cumulative preferred shares and $5,000,000 in common. Present holders of common stock will have the privilege of exchanging it for new preferred at par in the ratio of 80 per cent. of their holdings. The new preferred stock is redeemable at the option of the company after January 1st, 1915, at 120. The old preferred is redeemable at 107. At present no part of the new issue of common stock will be sold.

Covert Prepares for Large Expansion.

The Covert Motor Vehicle Co., which produces Covert axles and other parts, has acquired a tract of land adjacent to its present factory on Grand street, Lockport, N. Y., sufficient to permit the size of the existing factory to be tripled; the work of expansion will be commenced immediately.

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THE WEEK'S INCORPORATIONS




Wilmington, Del.—Universal Car Co., under Delaware laws, with $3,000,000 capital; to deal in motor vehicles.

Camden, N. J.—General Auto Co., under New Jersey laws, with $250,000 capital; to deal in motor cars. Corporators—Frank A. Kuntz and others.

Ocean City, N. J.—Ocean City Automobile Bridge Co., under New Jersey laws, with $250,000 capital. Corporators—Henry D. Moore and others.

Sales Co., under New Jersey laws, with $300,000 capital; to deal in motor cars. Corporators—Edward W. Rick and others.

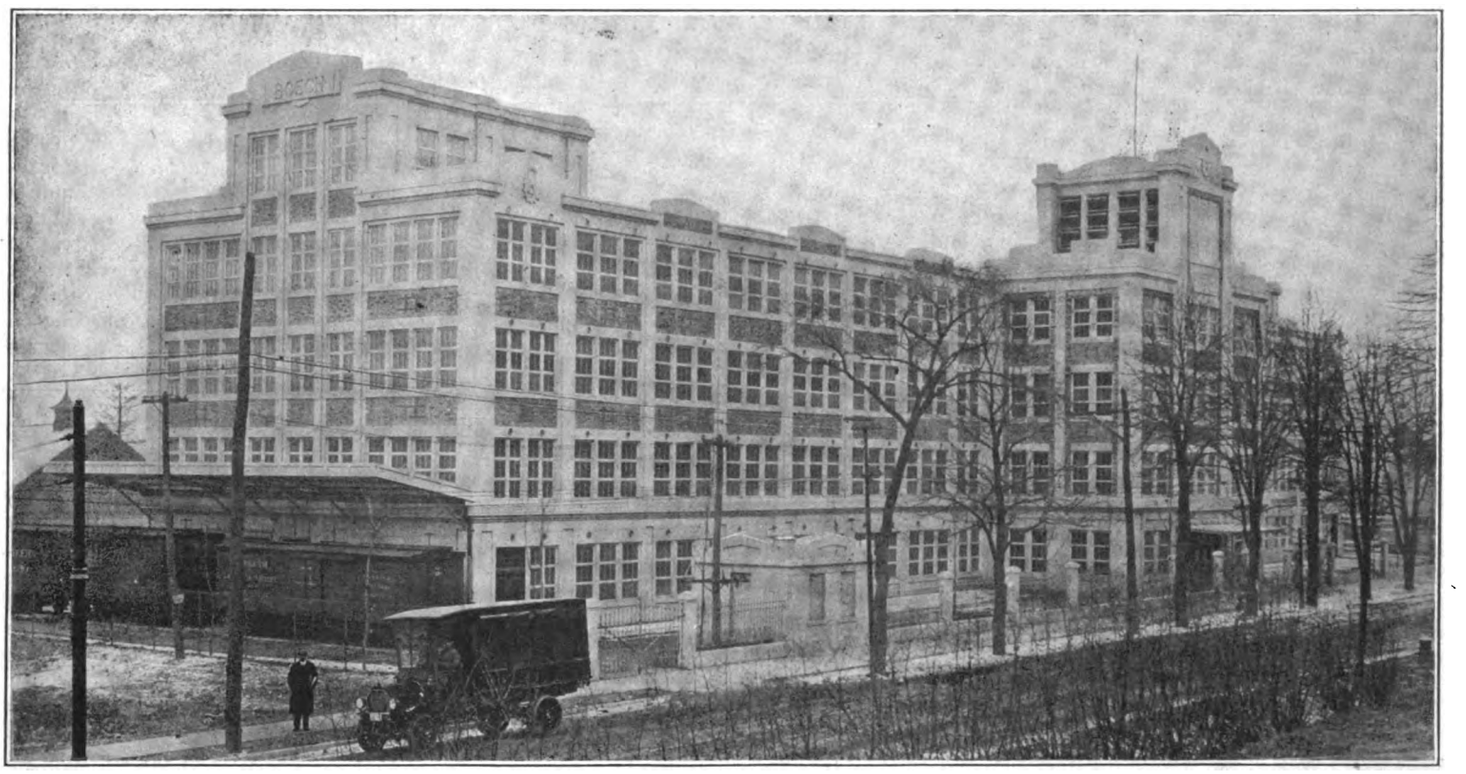
Los Angeles, Cal.—U. S. Motor Car Co., under California laws, with $50,000 capital; to deal in motor cars. Corporators—C. G. Jepson, C. M. Jepson, T. E. Weatherill.

New York, N. Y.—Kipp Auto Co., under New York laws, with $500 capital; to deal in motor cars. Corporators — Frank W. Kipp, Amanda W. Kipp, both of 756 Pelham

Nashville, Tenn.—Fiat Motor Car Co., under Tennessee laws, with $20,000 capital; to deal in motor cars. Corporators—O. C. Fleimner, E. Taylor, H. O. Bell, J. E. McCadden.

Bloomington, Ill.—Illinois Automobile Dealers' Association, under Illinois laws; to improve garage and road conditions. Corporators—J. H. Myers, L. D. Skaggs, Basil N. Ogden.

Skaneateles, N. Y.—Skaneateles Garage



THE IMPOSING FACTORY IN SPRINGFIELD, MASS., WHEREIN BOSCH MAGNETOS ARE PRODUCED

Louisville, Ky.—Commercial Motors Co., under Kentucky laws, with $10,000 capital; to deal in motor cars. Corporators—Harry B. Fitch, H. J. Hurt, R. E. Scharf.

Spokane, Wash.—Snell Motor Co., under Washington laws, with $100,000 capital; to manufacture motors. Corporators—Logan Snell, William R. Scott and others.

Watertown, Wis.—Buroff-Fuller Motor Co., under Wisconsin laws, with $30,000 capital; to deal in motor cars. Corporators—E. G. Buroff, R. A. Fuller, W. C. Tietz.

San Marcos, Tex.—San Marcos Auto Co., under Texas laws, with $2,000 capital; to deal in motor cars. Corporators—Frank Bradley, C. L. Hopkins, J. R. Desliger.

Camden, N. J. — National Automobile

avenue; Herman Neucrantz, 201 West 148th street.

Nashville, Tenn.—Fint Motor Car Co., under Tennessee laws, with $20,000 capital; to deal in motor cars. Corporators—O. C. Fleumer, M. D. Nelson, E. Taylor and others.

St. Louis, Mo.—Automatic Starter Co., under Missouri laws, with $50,000 capital; to manufacture engine starters. Corporators—John J. Cochran, William Ramsey, H. C. Whitehill.

Kansas City, Mo.—Automobile Training School Co., under Missouri laws, with $6,000 capital; to operate a training school. Corporators—H. J. Rahe, Edward Tilton, E. F. Powers.

Co., under New York laws, with $6,000 capital; to operate a garage. Corporators—George D. Cuddeback, Edward J. Stott, Florence K. Stott.

Los Angeles, Cal.—Berwick Motor Co., under California laws, with $10,000 capital; to deal in motor cars. Corporators—George B. Easton, William H. Armstrong, Albert Lee Stephens.

Buffalo, N. Y.—Brooks Motor Car Co., under New York laws, with $100,000 capital; to deal in motor cars. Corporators—Herman Rechsteiner, George B. North, B. O. Kerr, all of Buffalo.

Walkerville, Ont.—Baker Motor Vehicle Co. of Canada, under Ontario laws, with $100,000 capital; to deal in motor vehicles.

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Corporators—J. H. Walker, H. Walker, S. C. Robinson and others.

Frankfort, Ind. — Kernodle-McDaniel Mfg. Co., under Indiana laws, with $10,000 capital; to manufacture automobile supplies. Corporators—W. F. Kernodle, Maud Kernodle, Peter McDaniel.

Kansas City, Mo.—Resilo Tire Filling Co., of Kansas City, under Missouri laws, with $5,000 capital; to manufacture tire filler. Corporators—J. Morse Griffin, F. Sprague, G. W. Haverfield.

Poughkeepsie, N. Y.—Kirchner Motor Co., under New York laws, with $2,500 capital; to deal in motor cars. Corporators—Otto Kirchner, Charles Kirchner, John F. Townsend, all of 360 Main street.

Rockford, Ill.—Cotta Gear Mfg. Co., under Illinois laws, with $10,000 capital; to manufacture gears and transmissions. Corporators—P. A. Peterson, Levin Faust, Charles E. Cotta, F. W. Lindgren.

Wyoming, Ohio—Wyoland Automobile Co., under Ohio laws, with $10,000 capital; to deal in motor cars. Corporators—Roller Schickner, George Eversman, William Fetzer, P. F. Davidson, C. I. Sears.

Chicago, Ill.—Illinois Electric Motors Manufacturing Co., under Illinois laws, with $5,000 capital; to manufacture electric vehicles. Corporators—Abe F. Richman, James R. Semple, Edga E. Benedict.

Akron, Ohio—Ideal Commercial Car Co., under Ohio laws, with $200,000 capital; to manufacture commercial vehicles. Corporators—H. C. Gates, A. Tschantz, A. J. Dettoff, M. Stump, E. E. Quirk.

St. Louis, Mo.—Lindell Auto Sales Agency and Repair Co., under Missouri laws, with $3,000 capital; to deal in and repair automobiles. Corporators—A. F. Groebe, Theodore Spier, Charles F. Beck.

Augusta, Me.—Maine Transportation Co., under Maine laws, with $10,000 capital; to operate an automobile service. Corporators E. M. Leavitt, Winthrop; Ernest L. McLean and M. M. Spinney, both of Augusta.

Albany, N. Y.—Northern Motor Car Co., under New York laws, with $25,000 capital; to deal in motor cars. Corporators—R. Dudley Cannon, Arthur P. James, both of Albany, and J. Sommers McClellan, of Utica.

Brooklyn, N. Y.—East New York Taxicab Co., under New York laws, with $5,000 capital; to operate taxicabs. Corporators—Jacob Rauch, Frances Rauch, both of 73 Hendrix street; Dan Barnet, 56 Jamaica avenue.

Philadelphia, Pa. — Merchants Motor Service Corporation, under Pennsylvania laws, with $100,000 capital; to operate a motor delivery service. Corporators—George B. Teaz, George W. O'Day, Nathan W. Buzny.

New York, N. Y.—Hexolene Lubricating Co., under New York laws, with $6,250 capital; to manufacture lubricants. Corporators—Frederick Lesser, 64 East 93d street; Herman Ehrenthal, and Herman Bloch, both of 2452 Seventh avenue.

Buffalo, N. Y.—Electric City Specialty Co., under New York laws, with $25,000 capital; to manufacture motor car specialties. Corporators—Joseph E. Stark, 592 Swan street; John H. Baer, 170 Landon street; Ida E. Stark, 592 Swan street.

New York, N. Y.—American Barburetion Co., under New York laws, with $5,000 capital; to manufacture carburetters. Corporators — William H. Woolley, 2 Rector street; Albert G. Hibbell, 92 Fifth avenue; James F. Bisselle, 505 West 147th street.

New York, N. Y.—Robert Stock Auto Spring Wheel Co., under New York laws, with $300,000 capital; to manufacture automobile wheels. Corporators—Robert Stock and Augusta M. Stock, both of Tuckahoe, and Joseph F. Bokelmann, Yonkers.

Changes Among Prominent Tradesmen.

Wilbur F. Reynolds, sales manager of the Lippard-Stewart Motor Car Co., Buffalo, N. Y., has been appointed advertising manager as well. He will combine the duties of both departments.

Dwight N. Lane has been appointed factory superintendent of the Bantam Anti-Friction Co., Bantam, Conn. His previous experience embraces a long term of service with the New Departure Mfg. Co., of Bristol, Conn.

W. S. Pettit, who has been identified with the Studebaker Corporation for some time, has been appointed manager of its advertising department. He succeeds E. LeRoy Pelletier, who desires it generally known that he was "fired."

Frank H. Jones, who for a long term of years was general superintendent for the Warner Gear Co., of Muncie, Ind., has resigned that office to join the Muncie Gear Works, of the same city. He will fill the same post in his new place.

Ray C. Chidester, who has been sales manager for the Milwaukee (Wis.) branch of the Packard Motor Car Co., has been promoted to the management of the establishment. He succeeds C. L. Heffinger, who has been transferred to the Packard branch in New York City.

Matthew B. Morgan has been appointed chief engineer for the Marion Motor Car Co., of Indianapolis, Ind. For the past three years Morgan served in a similar capacity with the Chalmers Motor Co., and previously had experience with the Packard, Peerless and Olds companies.

Ray L. Sutherland has been appointed manager of the Indianapolis branch of the Studebaker Corporation to succeed Frank B. Willis, who resigned that position to become affiliated with the Metzger Motor Car Co. At one time Sutherland was agent for the Studebaker Corporation in Monticello, Ind., but more recently has served it as state superintendent of agents.

C. R. Newby, manager of the Studebaker Corporation's branch in Minneapolis, has resigned that office to join the Everitt Motor Car Co., which probably will be the name of the Everitt-Metzger-Flanders enterprise when it is floated, about July 1st. E. M. Greene, of Buffalo, and C. E. Stebbins, of Sioux Falls, managers of Studebaker establishments in those cities, also have resigned for the same purpose.

Joseph Gardham, factory manager for the Metzger Motor Car Co., of Detroit, has resigned that position to take charge of the factory operations of the Tudhope Carriage Co., of Orilla, Ont., which produces the Everitt car in Canada. Gardham thus will continue to be associated with Harry Bill, who last week relinquished the general management of the Metzger company to take charge of the automobile interests of the Tudhope company.

Ford to Assemble in St. Louis, too.

Carrying out the idea involved in the establishment of assembly plants to a degree that is unusual and unexpected, the Ford Motor Co., of Detroit, which only last month located a plant of the kind in Milwaukee—to say nothing of the four on the Pacific Coast and others in other localities—has purchased a plot of ground in St. Louis and will erect still another, with a capacity for assembling some 5,000 cars a year. The St. Louis plant, which is to be six stories in height, will have a frontage of 345 feet on Sarah street and 150 feet on Forest Park boulevard. No manufacturing will be done, the "knocked down" parts, manufactured in the Detroit plant, merely being assembled into complete cars.

N. A. A. M. Plans Summer Truck Show.

It is not unlikely that there may be no commercial vehicles included in the national shows in New York and Chicago next winter. Instead, it is possible that a truck show on a gigantic scale will be conducted by the National Association of Automobile Manufacturers during the summer of 1913. Nothing has been definitely decided, but the desirability of such a state of affairs was seriously discussed at the meeting of the executive committee of the N. A. A. M. in New York last week and was referred to the show and commercial vehicle committees for further consideration and recommendation. These committees will make a thorough canvass of the truck trade before reaching a definite decision.

Texas Truck Company in Trouble.

Alleging that all of the officers and directors, save one, have resigned, and that the stockholders have failed to elect their successors, also that the company has contracted large obligations and is insolvent, F. E. George, one of the creditors, has applied for the appointment of a receiver for the Commercial Motor Car Co., of South Houston, Tex. The order of the court was served on R. E. Twyford, as agent and director of the company, which undertook to build trucks but which did not build enough of them to attract attention to itself.

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William Sampson has opened a garage in St. Stephen, Me.

Edward E. Peterson has opened a garage in Maynard, Minn.

A garage is to be built in Storm Lake, Ia., by E. C. Moore.

P. J. Petre & Son are erecting a garage in Long Prairie, Minn.

J. T. Roggensack has bought the Kahler Garage in Rochester, Minn.

S. Lockie, in Fairfield, Cal., is remodeling a theater into a garage and livery.

Homer Judd and James Davis are about to build a garage in Bristol, Conn.

E. H. Blackler has opened a repair shop at 217 High street, Westerly, R. I.

S. R. Smith has opened a garage at 193 Church street, Poughkeepsie, N. Y.

Eugene Walton of Wilkesbarre, Pa., has opened a repair sop at 65 Hill street.

Frank T. Cassell of Peoria, Ill., is preparing to erect a garage on Liberty street.

W. G. Schultz is about to open an automobile repair shop in Mapleton, Minn.

A garage is being built in Johnson, Vt., by Charles Riddle and C. N. Farrington.

Louis Anderson is building a garage at Ferry and Bridge streets, Le Sueur, Minn.

The Motor Tire & Supply Co. has opened for business on King street, Winnipeg, Man.

R. A. DeMars is having a garage built in St. Thomas, N. D. It will be 30 x 60 feet.

Samuel Squires is about to erect a garage, 157x90 feet, on Park Square, Westfield, Mass.

Roy Mires, of Modesto, Cal., has become an automobile dealer; he is handling the Stutz car.

James Watson is to erect a garage in Livingston, Cal.; the main structure will be 48x80 feet.

Clarence E. Walker is about to establish a garage in Wilmington, Del., at 701 Van Buren street.

Carl Held has disposed of his interest in the Illinois Garage, Bloomington, Ill., to Simon Schad.

E. S. Kennedy, by profession a master mechanic, is about to open a garage in Bessemer, Ala.

Frank Butler and J. Mangan Brady are to embark in the garage business in Cooperstown, N. Y.

H. L. Craven, Maxwell dealer in and about Onawa, Ia., has admitted C. E. Blancard to partnership.

Under the style, Bonde Auto Co., Henry Bonde, of Fargo, N. D., has become state agent for Warren cars.

A. R. Lawson, garage proprietor in Racine, Wis., has sold out to William R. Taylor and William Gider.

The George Summers Garage, in Mitchell, S. D., has been leased by T. W. McGee, who will operate it.

Ernest H. Bearce, in Dover, Me., has become a partner with W. A. Hillman in the Exchange Street Garage.

Cleveland Firstenberger has embarked in the automobile business in Seneca, Kan.; he has the Buick agency.

Ross Leonard has sold the Auto Supply Co., in Washington, Pa., to F. L. Neill, who will continue the business.

J. C. Pursley and W. A. Stark, of Long Beach, Cal., are having a garage built at Ocean and Chestnut avenues.

L. E. Raney, of Salt Lake City, Utah, is about to enter the garage business in Evanston, near Salt Lake City.

J. O. McClay has purchased the Anderson interest in the Anderson-Crocker Automobile Co., of Osawatomie, Kan.

The Smith Hardware Co., Pine City, Minn., has entered the automobile selling field; it has secured the Ford agency.

C. A. Elster is going into the garage and accessory business in Springville, Cal. Quarters are now being built for him.

S. A. Ross is transforming half of a washing machine factory, in Stuart, Ia., into a garage. He will also deal in accessories.

George C. Leidhold, of Pittsfield, Mass., has secured authority to erect a garage, 51x80 feet, at 126 South street; it will cost $3,000.

Arthur T. Britton and E. A. Wickland are about to embark in the garage business in Santa Clara, Cal., at 590 South First street.

The Highland Theater, on South Highland avenue, East Liberty, Pa., is being remodeled into a garage by W. M. Laird, the owner.

Winne Foote, formerly head machinist in the Mason & Seabury Garage, Missouri Valley, Ia., has purchased a third interest in the business.

Fox & Gruenamyer have secured authority to build a one-story brick garage at 5326-30 Moneta avenue, Los Angeles, Cal.; it will cost $4,500.

A four-story concrete garage, 65x100 feet, is being erected for Carrie L. Burton at 29-35 Cummington street, Boston, Mass.; it will cost $50,000.

C. F. Hugo, of St. Louis, Mo., has opened up under the style, Grand Auto and Garage Co., at 3441-47 Junction street. He is negotiating for an agency.

Oakland Garage is the title to be assumed by a business being launched in Missouri Valley, Ia., by George Culavin; a new building is being erected.

The Harrold Banking and Savings Co., of Macon, Ga., has let the contract for a two-story garage, to be erected near its present place of business.

The Walsh Garage, at 188-192 Eighth street, Milwaukee, Wis., has undergone a change of ownership and will be known hereafter as the Schultz Garage.

J. H. Clemings, a Minneapolis (Minn.) restaurant proprietor, is to enter the garage business. His building, 126x50 feet, will be erected at 26th and Nicollet street.

Wiggins Bros., Los Angeles, Cal., have purchased property at Avenue 20 and North Broadway and will erect a garage, 55 x 160 feet; it will represent a cost of $10,000.

T. F. Santry has leased from W. Butler Duncan a garage which the latter is building in Tompkinsville, N. Y. Santry's son, Frank J., will operate the establishment.

A. C. Jungck, formerly credit man for the Pence Automobile Co., Minneapolis, Minn., has purchased an interest in the Auto Tire Sales Co., 151 West 6th street, St. Paul.

Thomas E. Cannor and Thomas Nee have formed a partnership in Hartford, Conn., to carry on an automobile and carriage painting business at 113 Vine street.

Otto Freyer has accepted plans for a one-story brick garage, 53x131 feet, to be erected on 155th street, west of Union avenue, New York City; it will cost $12,000.

George A. Clark has secured permission from the authorities of Minneapolis, Minn., to erect a brick garage, 96x142 feet, on Bryandt avenue, south, in the Groveland Addition.

The O'Donald-Ratcliffe-Davis Co. has entered the automobile trade in Jacksonville, Fla.; its garage is at 114 West Bay street, where the Lyle Garage formerly was located.

The Misses Cornelia L. and Carrie F. Jones are to be owners of a garage now being erected at 25th and Farnam streets, Omaha, Neb. It will be 60x122 feet and will cost $30,000.

The Bailey Street Garage, Whittier, Cal., formerly owned by Denngen & Harvey, has been purchased by H. A. Woodworth and C. A. Watts; they will continue the business as heretofore.

Harry Parker, of Kalamazoo, Mich., has purchased of Albert E. Rose, president of the Kalamazoo Auto Sales Co., the latter's interest in the firm. It is located at 116 North Edwards street.

H. P. Blaisdell and John Anderson are

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having the Erwin Building on Bay street, Grand Rapids, Mich., remodeled into a garage and will begin business as soon as the work is completed.

Herman Haines has bought out his partner, B. B. Iseminger, and is now sole proprietor of the Defiance (Ia.) Garage. Iseminger has become a salesman for a Council Bluffs supply house.

A. L. Albee and H. F. Baxter, trading as the Alpena Motor Sales Co., have entered the automobile business in Grand Rapids, Mich., at 130 Crescent street, west. They will handle Alpena cars.

G. W. Woodland and C. W. Cowdin, of Grand Rapids, Mich., have opened a garage in what was a Christian Reformed Church at 50 South Commerce street. Woodland was formerly a chauffeur.

The Kalamazoo Vulcanizing Co. has been formed in Kalamazoo, Mich., by Clare Burleigh and Herman Buck Triestram. They will locate at 112 North Burdick street and will carry a full line of tires.

Receivership proceedings have been commenced against the Auto Sales and Repair Co., of Houston, Tex. They were instituted by the American Mortgage and Loan Co., whose claim amounts to $6,000.

B. N. James, formerly foreman of the chassis and repair department of the Velie Automobile Co., of Moline, Ill., and also a travelling representative of that firm, is about to open a garage in Watertown, N. Y. He is erecting a two-story building on Court street, with accommodations for 150 cars.

The Benoist Auto Supply Co., headed by F. Elmer Benoist, just has been formed in St. Louis, Mo., to take over the business of the Benoist-Pondrom Co., accessory dealers. Quarters will be maintained at 4374 Olive street, to which address the absorbed company recently moved from 3923 Olive street.

The retail business of the Smith-Worthington Co., of Hartford, Conn., maker of automobile and carriage leather goods, has been taken over by the C. A. Carroll Co., which has been incorporated and which will continue the retail store at 32-38 Ford street, Hartford. It will remain under the direction of C. A. Carroll, the president of the new company, who has been in charge of the store for years. The other officers are: Vice-president, William T. Pitkin; secretary, John J. McKone.

Recent Losses by Fire.

New York, N. Y.—Goodrich Tire & Rubber Co.'s branch, 1780 Broadway, damaged. Loss, $1,000.

Atlanta, Ga.—Cowart Auto & Accessory Co., 147 Edgewood avenue. Building gutted, six cars destroyed. Loss, $10,000.

Detroit, Mich.—Diamond Mfg. Co., factory and contents destroyed. Loss, $250,000. Detroit Copper & Brass Co., adjoining, damaged.

DIVERGENT CLAIMS IN BODY SUIT

Bankrupt Rothschild Firm Demands Payment—Simplex Company Charges Poor Workmanship.

Efforts of Henry B. Singer, as trustee in bankruptcy of Rothschild & Co., New York, body builders, to secure as much as possible for the creditors, are responsible for a number of legal actions, one of which, against the Simplex Automobile Co., of New York, is on the current calendar of the Supreme Court for New York county. The complainant asks a total of $8,216.70 on a contract for bodies, but the answer filed by the Simplex people bids fair to make adjudication in the case difficult.

Both sides admit the execution of a contract for 38 bodies, and the body builders claim they made several which were delivered and paid for, but add that they partially completed nineteen bodies for which the Simplex company furnished no chassis and which class of body Rothschild & Co. The body builders claim their profits would have been $2,500 and that in bringing the bodies to their present state they have expended $5,716.70.

The answer of the Simplex company is that the contract called for aluminum bodies with aluminum castings of such a nature that joints did not weaken in service and which class of body Rothschild Co. previously had built with skilled designers and artisans. Following the bankruptcy, however, it is alleged that so many of the skilled workmen were dismissed or left the Rothschild employ that the bodies produced were not satisfactory, whereupon the Simplex company declined to accept any more of them, and was required to have the bodies it required built elsewhere at an increased cost of $2,000, which amount is set up in a counterclaim.

Four More New "Sixes" in Prospect.

In addition to the Cole Junion, the Cole Motor Car Co., of Indianapolis, will produce a six-cylinder model for the 1913 market. The Nordyke & Marmon Co., of Indianapolis, also will add a "six" to its line. Among the other new "sixes" which are due to make their appearance in the late summer or early fall, there will be a Jackson and a Cutting, both produced by the Jackson (Mich.) companies of those names.

Large Gain in Engine Exports.

While the exportation of American automobile engines to foreign countries for the month of March, 1912, showed a slight falling off as compared with February, the exports for April, in number and value, show such a gain as to completely offset the loss of the first Spring month. April exports were valued at $146,671, while the March figures were $102,010, a gain of $44,661, nearly 44 per cent. March's exports numbered 831, while the number in April was 1,462. This increase is 651, about 76 per cent. Government statistics do not include a separate classification of engines previous to July, 1911, so no comparison for long periods is possible. However, for the ten months ending April, 1912, the number of engines exported was 5,777 and their value was $665,989.

Knight Wins Legal Fight in Germany.

According to a cablegram received from Charles Y. Knight, through his American representative, the German courts last week rendered a substantial decision in favor of his sleeve valve patent. Knight's message was as follows:

"Action brought by Benz for revocation double sleeve patent argued here to-day before five judges of nullity court and immediate decision rendered allowing new and stronger second claim fully covering construction of double sleeve engine. First claims unaltered."

Although the cablegram leaves much to be desired, Knight's American press agent declares that the decision is "one of the most sweeping ever made in Europe."

Body Attachment Brings Quick Payment.

Frank J. Griffin, of New York City, who called himself the Auto Association, has completed payment of the judgment of $473.75 obtained against him by the Ajax-Grieb Rubber Co. Griffin had reduced the amount to about $50, and then dallied, but the Ajax company found a way of hurrying him. It last week applied for a body attachment, and when it was issued Griffin found the necessary money in short order.

Martin May Secure Tractor Factory.

It is not improbable that C. H. Martin, the patentee of the Martin three-wheel tractor, which is being produced under royalty by the Knox Automobile Co., of Springfield, Mass., may locate a plant specially for the manufacture of the contrivance in Indianapolis. He recently spent some time in that city, and it is stated that he enlisted sufficient support to make possible the establishment of a factory.

Simplex Completes Removal to New Jersey.

The Simplex Automobile Co. has completed the removal of its plant from New York City to New Brunswick, N. J., where its factory covers three city blocks. The former plant on the East River front of New York, of course, has been abandoned, but the service station in Long Island City and the retail branch at 240 Central Park South are being continued.

Timken Buys Factory Site in Toledo.

The Timken-Detroit Axle Co. has purchased a tract comprising several acres in Toledo, O., located on Central avenue and the Lake Shore and Michigan Southern Railway. While no official statement has been made, the purchase naturally is taken as presaging a Timken plant in that city.

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THE MOTOR WORLD

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TRUCK CONTESTS AND THEIR CONTROL.

One of the automobile publications which limits itself to commercial vehicles is greatly concerned because of the control of truck contests and demonstrations by the American Automobile Association. It not only finds fault with the A. A. A. rules governing such affairs but would have it believed that "the A. A. A. is incompetent to handle this branch of automobile activity." "It is absurd for an outside body like the A. A. A. to continue to tax this industry for permission to hold contests," according to our more or less excited contemporary; all of which is more entertaining than convincing.

But as the A. A. A. truck rules represent the desires and recommendations of the Manufacturers' Contest Association, any criticism thereof necessarily must attach to that organization, which certainly is sufficiently representative to know what is best for the industry. It undoubtedly is true, as our contemporary points out, that many of the leading truck manufacturers are opposed to contests. They are wholly artificial growths and most of them have lacked real meaning, but so many self-seeking promoters and so many of those identified with the sale, if not the manufacture, of commercial vehicles are possessed of the idea that it is necessary to "boom things," that contests will continue until the "boom" idea is dissipated.

Since they must continue to a greater or lesser extent, it certainly is the better part of wisdom that they be controlled; and the purely nominal "tax on the industry" which is levied by the A. A. A. is the surest way of controlling them and keeping them within reasonable bounds. As the A. A. A. is the recognized authority in all matters pertaining to automobile competition, and as it has the necessary machinery, it is the logical and proper body to deal with commercial vehicle competition, particularly since the A. A. A. is at all times amenable—too amenable it sometimes has appeared—to the desires and demands of the manufacturers, any criticism of its control is strained, far-fetched and misdirected. None of its real well wishers would care to see the N. A. A. M. project itself into such matters, and we dare say the heads of it are too wise and far-seeing to pilot it into such troubled waters, in which it has small place and only indirect concern.

In due time, the motor truck contest will die a natural death and become as extinct as contests between horse-drawn vehicles. Indications of its dissolution already are visible and, safe to say, neither the A. A. A. nor the N. A. A. M. will grieve deeply when demise occurs. The A. A. A., however, is perfectly able to handle the patient and as competent to bury Caesar as to feed him pills.

POSSIBILITIES OF CARBURETTER IMPROVEMENT.

It is impossible to view the efforts that have been made of late years to evolve devices designed to improve carburation and so effect fuel economy without leading up to the suggestion that, good as they are, the carburetters of the present day still leave something to be desired. It is the testimony of nearly every one using these auxiliary devices that they serve their purpose, and that in some cases the results have been not short of remarkable.

It is undoubted that all spray carburetters form a mere mechanical mixture of gasolene and air; and that while some carburetters atomize the fuel more minutely than others, all produce a fine spray rather than a truly homogeneous mixture—a real gas. It is as plain that the employment of auxiliary devices for further subdividing the particles of gasolene renders the fuel susceptible of more rapid ignition and combustion than the comparatively raw mixture, and that this is the basis of economical power production, inasmuch as it permits the complete combustion, at the maximum rate, of all the gasolene in the cylinders.

The arguments in favor of the auxiliary devices are given added force by the early contrivances which produced the mixture by drawing air through wicking saturated with gasolene, the heavy vapor being diluted with air admitted through a manually—and continually—adjusted auxiliary air inlet. While these old wick carburetters were crude in the extreme and required unremitting watchfulness, it is unquestionable that they could drive a car amazing distances—when correctly adjusted—which can be accounted for only by assuming that the mixture furnished was homogeneous in the extreme, which is an entirely logical conclusion, for the air, passing through the wicking, carried with it only evaporated gasolene; there was no spraying action.

Later types of these so-called wick carburetters, used with motors of comparatively high development, served to emphasize this economy, and the question naturally arises: Was not this efficient, if crude, device abandoned without proper experimentation, and in the light of present knowledge is it not worth further study and capable of useful adaption or development?

But whatever may be the principle invoked, and however its application may be effected, there seems to be little doubt ever its application may be effected, there seems to be little doubt that there is an opportunity for the improvement of the carburetter along the lines suggested.

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WORK HEAD OF GREATER GOODRICH

President of Old Company Formally Chosen to Lead New One—Its Financial Condition Publicly Disclosed.

Directors of the new B. F. Goodrich Co. —the $90,000,000 New York corporation which took over the Diamond Rubber Co. —at a meeting which occurred yesterday, formally elected officers in accordance with the slate which previously had been made public, and which was published in the Motor World of May 23d. They are as follows: President, B. G. Work; first vice-president, A. H. Marks; second vice-presidents, E. C. Shaw, H. E. Raymond and W. B. Miller; secretary, C. B. Raymond; treasurer, W. A. Means.

Among the directors are Philip Lehman and Henry Goldman, who represent the banking interests which arranged the Goodrich capitalization, and A. H. Wiggin, president of the Chase National Bank of New York. The tenure of several of the directors, however, is of a temporary nature. They probably will step down and out at the next meeting, which will occur in New York on June 26th, when the directorate will be increased from 12 to 16 members.

All of the Goodrich stock that was to be offered for sale already has been subscribed, and the bankers in making public the financial condition of the new company state that they do so as a "matter of record only." The balance sheet, as at April 1st, after the issue of its capital and the taking over of the Diamond Rubber Co., shows assets amounting to $100,877,-604.46, of which $72,325,188.42 are represented by real estate, plant, goodwill, patents, etc., $17,776,579.76 by materials and goods finished and in process, $7,290,189.56 by accounts and bills receivable, and $1,-390,738.25 by cash.

Liabilities are made up of capital stock, $90,000,000; surplus, $2,200,000; and current liabilities as follows: bills payable, $4,310,-665.23; accounts payable, $1,173,811.75; sundry accounts, $153,542.98; the B. F. Goodrich Co. of Ohio, $937,684.98; the Diamond Rubber Co. of Ohio, $850,000; miscellaneous reserves, $1,251,899.52. Total, $100,877,604.-46.

The public statement shows that the gross sales of the Goodrich and Diamond companies for the fiscal year ending September 30th last amounted to $48,528,112.01, on which the profit earned amounted to $7,805,312.48. For 1910, the record was: sales, $45,800,534.93; profits, $6,384,059.56; for 1909, sales, $22,087,854.03; profits, $8,-063,146.60.

Expansion of British Rushmore Company.

Rushmore Lamps, Ltd., of London, which is the British company that handled Rushmore lamps and other products in Great Britain, is going into voluntary liquidation. According to published statements, the step is being taken in order to facilitate the formation of a new company of the same name but with increased capitalization, expansion having been found necessary because of the increased demand for the company's products.

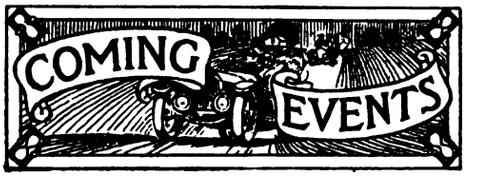
Detroit Flouts Indianapolis's Pretentions.

Indianapolis is making a determined effort to annex the glory of being the American "automobile capital," which proud distinction by general consent has been accorded to Detroit. In other words, Indianapolis is "after" Detroit, the business interests in the Indiana city having subscribed funds to further the work. Among others, J. J. Cole, president of the Cole Motor Car Co., has contributed $5,000 to a fund for the exploitation of Indianapolis as an automobile center. At last accounts, however, Detroit was not greatly disturbed by its threatened loss of glory, nor had the green-eyed monster been greatly aroused, the feeling in Michigan being well reflected by the Detroit Saturday Night, which flouts Indianapolis's pretentions in this fashion:

"'The Ultimate Motor Car Hub of the World.' That's what the automobile manufacturers of Indianapolis term their city in a double page advertisement in Collier's Weekly. Oh, well, so long as it's to be the 'ultimate' hub, let's not get angry about it. In the meanwhile, it looks like a pretty good bet that there's at least one factory in Detroit that turns out more automobiles in one year than all of Indianapolis combined. If it doesn't, it would not be very difficult to find two that can turn the trick. But so long as the Indianapolis manufacturers term themselves the 'ultimate' hub, Detroit can afford to take a chance on the future. Let's see—how does Webster define 'ultimate'? He says this: "farthest; most remote in space of time; extreme; last; final; last in a train of progression of consequences; arrived at as the last result.' So long then as our Indianapolis rivals admit that their chance for hub supremacy is about the most remote thing on earth in the auto industry, we feel like taking a little liberty with a well known advertising slogan and ask: 'Ultimately—Why not now'?"

Forgetfulness Cost Company $25.

The forgetfulness of the Touring New York Automobile Co., of 173 Fifth avenue, New York City, in failing to file its annual corporation report on time, cost it $25 in United States District Court for the Southern District of New York this week, this compromise figure being considerably less than the $10,000 maximum penalty asked in the complaint served by the United States district attorney. It may be added, however, that the maximum is generally asked but the minimum compromise figure, $25, is often accepted. The case was discontinued after settlement. A similar action against the Stearns Automobile Repair Co., of New York, was dismissed on evidence that the concern is no longer in business to an extent which would warrant the imposition or collection of a fine or other penalty.



June 15, Elm Ridge, Ill.—Track races under the auspices of the Automobile Club of Kansas City.

June 15, Cincinnati, Ohio — Cincinnati Automobile Dealers' Association's annual hill climb on Stanley avenue hill.

June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

Jnue 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 23-29, Laurel, Md.—Track races promoted by R. E. Shadel.

June 25, Denver, Colo.—Denver-Chicago sociability run, under the auspices of the Denver Chamber of Commerce.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-5, Tayor, Tex.—Track races under the auspices of the Taylor Automobile Club.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

July 5-6, Tacoma, Wash.—Road races under the auspices of the Montamars Festo Automobile Commission.

July 15, Milwaukee, Wis.—Reliability tour under the auspices of the Wisconsin State Automobile Association.

July 15-16, Cleveland, Ohio—Reliability run under the auspices of the Cleveland Newsw.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2, Indianapolis, Ind.—Track races.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

Kentucky Iron Works Takes up Trucks.

The Stewart Iron Works, of Covington, Ky., which is across the river from Cincinnati, O., has taken up truck manufacture. It will build a one-ton vehicle which will be styled the Stewart, of which it is planned to produce 300 during the first year. G. Taylor, who acquired the necessary experience in the East, is in charge of the Stewart truck department.

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BURMAN STARS AT QUAKER MEET

Gathers Honors and Coin in Four Out of Five Events—All That He Leaves is Equally Divided.

Saturday last, 8th inst., was "Burman day" in Narbeth, Pa., where the Quaker City Motor Club staged a ten-event meet on the Belmont Driving Park track. In all save one of the five events in which he was entered Burman carried off the honors, using three different cars in doing so. The ten-mile 451-600 cubic inch displacement race he won in the big Cutting machine—in which he came to grief at Indianapolis — in 10:15:14; two three mile free-for-all events for the Remy brassard and Remy trophy, in which he piloted an Ohio car, Burman won in 2:56.81 and 3:82, respectively, while he accounted for an event for cars with piston displacements from 231 to 600 cubic inches, which went for 25 miles, making the distance in the Cutting in 25:53:42. In the solitary time trial which formed part of the day's program, Burman drove the Blitzen Benz around the mile track in 54:26 and thereby lowered the Philadelphia track mile record held by Ralph De Palma by 3:44.

The first event of the day, ten miles for cars in the 161-230 inch displacement class, went to E. Bauer, who drove a Buick and won in 11:34.08 from a field of four. A second ten mile event for machines in the 231-300 class was called off after having gone four miles, when an E-M-F car driven by W. Burke threw a shoe and skidded through a fence. So much dust was raised by the skidding machine that Frank Fanning, who drove the Bergdoll entry, ran foul of the E-M-F machine and also skidded through the fence. Neither driver was seriously hurt, but their cars were wrecked. Three spectators who were viewing the contest from the point of vantage offered by the height of the top rail of the fence, were thrown to the ground and sustained injuries which, while painful "in plenty," were not sufficiently serious to necessitate removal to the hospital. P. J. Thebaud (Mercer) and John Menker (Kline) were flagged by the referee in order to prevent a further mixup. J. Raimey, the Ohio driver, had dropped out.

A six-mile match race was hastily arranged for the "survivors," P. J. Thebaud (Mercer) and John Menker (Kline), who were flagged after the accident, and Thebaud won in 6:20.58. John Menker, the Kline driver, won the five-mile event for cars with piston displacements of 301-450 inches, in 5:09.99, against two contenders. A special five-mile match race, in which the cars ran on second gear, went to W. M. David, who handled the wheel of a Lion car; while the five-mile free-for-all, a handicap event, was won by P. J. Thebaud, in a Mercer. The summary:

Ten miles, 161-230 inches displacement —Won by E. Bauer (Buick); second, G. Duval (Flanders); third, R. Scott Smith (Empire). Time, 11:34 8-100.

Ten miles, 231-300 inches displacement —Stopped fourth mile owing to accidents, with John Menker (Kline), P. J. Thebaud (Mercer) running.

Six miles, match between two drivers left in event No. 2—Won by P. J. Thebaud (Mercer); second, John Menker (Kline). Time, 6:20 28-100.

Five miles, 301-450 inches displacement —Won by John Menker (Kline); second, L. R. Blockson (Stutz); third, P. J. Thebaud (G. J. & G.). Time, 5:09 99-100.

Ten miles, 451-600 inches displacement Won by Robert Burman (Cutting); second, Ralph D. Earle (American). Time, 10:15 14-100.

Three miles, free-for-all, first heat for Remy brassard and trophy—Won by Robert Burman (Ohio); second, Joe Matson (Benz). Time, 2:55 81-100.

Three miles, free-for-all, second heat for Remy brassard and trophy—Won by Robert Burman (Ohio); second, Louis Meneghetti (Mercedes). Time, 3:82.

One mile exhibition—Robert Burman (Benz). Time, 54:26.

Five miles, match race, cars running on second speed—Won by W. M. David (Lion); second, E. H. Irvin (Otto). Time, 7:24 37-100.

Twenty-five miles, combination, 231-600 inches displacement—Won by Robt. Burman (Cutting); second, Ralph D. Earle (American); third, John Raimey (Ohio). Time, 25:53 42-100.

Five miles, free-for-all, handicap—Won by T. J. Thebaud (Mercer); second, Robert Burman (Ohio); third, E. Bauer (Buick). Time, 5:10 56-100.

85,300 Motor Vehicles in New York.

During the five months of the fiscal year ending June 1st last the number of automobiles registered in the state of New York was exactly 85,300, which is seven hundred less than the total for the entire previous year. The number of chauffeurs licensed during the same period was 36,065, and the dealers registered numbered 1,572. Of the 85,300 vehicles enrolled, 76,164 are pleasure cars, 7,320 commercial, 1,572 dealers' vehicles, and 244 which are exempted by law. The total fees received amounted to $856,-310.25.

New York county, of course, is far ahead of all the others, having 16,821 pleasure cars, 3,514 commercial, and 255 dealers' vehicles enrolled. More than half of the registered chauffeurs also are located in New York—15,947, to be exact. Kings county, which is a part of New York City, follows New York county, with 6,779 pleasure cars, 797 commercial and 90 dealers' vehicles, and 4,954 chauffeurs. Erie county, in which Buffalo is located, is third on the list, with 5,723 pleasure cars, 516 commercial and 95 dealers' vehicles and 1,445 chauffeurs.

SALEM FEATURES 50-MILE EVENT

Of Seven Starters All but Two Fail to Finish—Other Races Are from One to Twenty Miles.

Two postponements did not serve to mar the Rockingham Park track meet in Salem, Mass., which finally was run on Saturday last, 8th inst., although originally scheduled for Memorial Day. No less than eight time trials, in which Charles Basle, who drove a Bianchi car, turned off the fastest mile, 1:03⅗, and five competitive events comprised the program. The honors were well distributed.

The big feature of the day was the 50-mile Class E race, in which seven contesters started and which went to J. H. LeCain in a Stutz, with Harry Grant, who drove a Berkshire, in second place. All varieties of trouble were encountered by the other five contestants, so that LeCain and Grant were the only finishers. LeCain's time was 1:00:20. Grant, who had had trouble, finished nearly 15 minutes later. Grant, however, won a special 20-mile match race in 25:12⅘, beating out H. H. Cobe in a Jackson and Charles Basle in the Chadwick.

The free-for-all event, which went for 10 miles, was won by J. F. Esleek, at the wheel of a Lexington, his time being 13:22⅗. A. J. Willis, in a Hudson, finished second, while third place went to L. Hersey, who piloted a Chadwick. The summary:

One mile time trials—Charles Basle (Bianchi), 1:03⅗; L. Hersey (Chadwick), 1:05⅗; J. H. LeCain (Stutz), 1:05⅘; Harry Grant (Berkshire), 1:07; Harold Cobe (Jackson), 1:11⅗; J. F. Esleek (Lexington), 1:14; A. J. Willis (Hudson), 1:15⅗; J. Cathart (Metz), 1:18⅘.

Five miles, 301-450 cubic inches displacement—Won by G. C. Jessup (Buick); second, J. H. LeCain (Stutz). Time, 5:37⅖.

Five miles, match race—Won by John J. Kingsley (Thomas); second, Nelson Slater (Bianchi); third, C. Bibelow (Buick). Time, 5:51.

Ten miles, free-for-all—Won by J. F. Esleek (Lexington); second, A. J. Willis (Hudson); third, L. Hersey (Chadwick). Time, 13:22⅗.

Fifty miles, Class E—Won by J. H. LeCain (Stutz); second, Harry Grant (Berkshire). Time, 1:00:20.

Twenty miles, match race—Won by Harry Grant (Berkshire); second, Harold Cobe (Jackson); third, Charles Basle (Chadwick). Time, 25:12⅘.

Track's Condition Defers Racemeet.

The track races which were to have been run at Elm Ridge, Mo., under the auspices of the Automobile Club of Kansas City, on Saturday last, 8th inst., could not be staged owing to the poor condition of the course. The program will be carried out next Saturday, June 15th, weather permitting.

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"ATHLETES" LOSE INTER-CLUB RUN

Chicago Motor Club Wins Reliability Contest 34 to 70—Spill on Second Day Practically Settles It.

Although at the close of the first day the showing made by the team of the Illinois Athletic Club, which incurred but four penanties as against 28 piled up against the team of the Chicago Motor Club in the first annual interclub reliability match, made it seem well nigh certain that the "athletes" would carry off the honors, the tables were reversed in the course of the next twenty-four hours, when the Premier car, driven by H. Paterson, landed in a ditch and loaded a penalization of 45 points on the shoulders of the I. A. C. team. This, coupled with 22 demerits earned by F. W. Stewart, who piloted a Buick, and a few other odd penalties made by others of the team of 16, gave the I. A. C. team a total debit of 70 points against 34 piled up against the 19 members of the Chicago Motor Club team during the two days, and gave the victory to the latter.

The run, which started from Chicago on Thursday last, 6th inst, with La Salle as the turning point and night stop, was run as a Grade 3 event, except that, owing to the fact that the rules under which the contest was run varied so widely from those of the contest board of the A. A. A., the sanction was issued at the last minute, and only with the understanding that the contest board would consider no protests.

Poor roads, which everywhere were encountered, necessitated frequent tire changes, but as no penalties were inflicted for tire repairs and it was permissible to stop the motor while making such repairs, many cars pulled through the ordeal with perfect scores, although tire changes and motor stops had been made. In all, 11 of the C. M. C. cars scored perfect, while 10 of the I. A. C. contenders escaped penalization during the 190-mile run.

The scores for the two days are as follows:

Chicago Motor Club.

	1st day	2d day	Total
C. A. Briggs, Chalmers	0	2	2
J. G. DeLong, Chalmers	2	2	4
C. G. Sinsbaugh, Velie	0	0	0
W. T. Stalnaker, Premier	0	0	0
R. G. Melcher, Chalmers	21	0	21
Chas. Van Sicklen, Apperson	0	0	0
E. W. Schillo, Mercer	Withdrawn		
S. D. Hirschle, Pierce-Arrow	0	0	0
M. J. Kavanaugh, Midland	1	0	1
E. H. Lee, Krit	0	0	0
F. Zimmerman, Stutz	0	0	0
J. Sackett, Midland	1	0	1
O. B. Brown, Velie	4	0	4
C. G. Simmons, Hupmobile	0	0	0
S. Breakstone, Midland	0	0	0
J. Gaidzik, White	0	0	0
W. Choate, Kissel	0	0	0
B. Githens, Everitt	0	1	1
Deagen, Pierce-Arrow	0	0	0

Team total, 34; fractional penalization, 28.33 points.

Illinois Athletic Club.

F. C. Lewis, Chadwick	0	0	0
J. Iverson, Apperson	0	0	0
P. A. Cooney, Winton	0	0	0
S. J. Knowles, Also	1	0	1
L. Ganshue, Bergdoll	0	0	0
George Knabe, Pierce-Arrow	0	0	0
C. J. Stein, Winton	0	0	0
Emil Wolff, Locomobile	0	0	0
J. C. Wilson, Cadillac	0	0	0
G. H. Moore, Maxwell	1	0	1
F. W. Stewart, Buick	0	22	22
Wm. C. Regelin, Cadillac	Withdrawn		
C. H. Peterson, Maxwell	1	0	1
M. L. Caton, Overland	0	0	0
E. Bersbach, Mitchell	0	0	0
H. Paterson, Premier	0	45	45

Team total, 70 points.

"Automobile Carnival" for New York.

According to the present plans of the Hotel and Business Men's League, which has planned an all-summer festal time to attract visitors to the metropolis and, incidentally, to the hotels, New York City is to have an "Automobile Carnival Week," the dates being Monday, July 14th, to Saturday, July 20th, inclusive. Monday will be given over to an entertainment at the Automobile Club of America, with visiting motorists as guests, unless the plans go awry; Tuesday there will be a "flower pageant," followed at night by a parade of illuminated electric cars; Wednesday a climb up Fort George Hill is scheduled; Thursday there will be a guessability contest over the roads of Long Island and Westchester county; Friday there will be entertainments of various kinds for visitors, including trips in New York and surrounding territory; and on Saturday night, at 8 P. M., the festivities will wind up with an illuminated parade of commercial and pleasure vehicles, with the added feature of a section for grotesque floats.

Vanderbilt Spectator Finally Loses Suit.

The small distance of fifty feet stood between Ralph S. Baldwin, of Norwalk, Conn., and $8,000 in damages, which were awarded him and his father, Dr. Winfield S. Baldwin, for damages sustained at the 1906 Vanderbilt Cup Race, when the Locomobile racer, driven by Joe Tracy, left the road and rushed into the crowd, nearly tearing young Baldwin's right leg from his body. The case was tried in the Supreme Court for Queens County, N. Y., two years ago, and the jury that heard the case awarded young Baldwin $7,000 and his father $1,000. The Court of Appeals set the verdict aside on the grounds that it was a question of fact for the jury to decide whether the youth stood fifty feet outside the danger line of the course as established by the racing committee, and following the decision witnesses were again called into the lower court and a jury was called upon to consider this point. The hearing ended this week, when the second jury returned a verdict for the Locomobile company. This decision holds the Locomobile company not negligent in the accident.

"INSURGENTS" "STEAM-ROLLERED"

"Wall Street Element" Tightens Grip at A. C. A. Election—Whitridge Chosen President and Vanderbilt Returns.

Unless surface indications are deceiving, the "insurgents" who so recently disturbed the tomb-like peace of the Automobile Club of America have been effectually squelched, the so-called Wall Street element having been more firmly entrenched at the annual meeting of the governors of the big New York organization on Thursday last, 6th inst., when Frederick W. Whitridge, a "dark horse" and a new member of the club, was elected to the presidency to succeed Henry W. Sanderson. Henry Evans had been slated for the position, but for some reason Whitridge, a lawyer, who is president of the Third Avenue Railway Co. and receiver for Third Avenue subsidiaries, was voted into the office without opposition. Evans was chosen first vice-president to succeed George W. Perkins, and the official "steam roller" was run over Robert Lee Morrell, one of the chief insurgents, when Edward Shearson was named as his successor as first vice-president. H. R. Taylor was chosen to fill the third vice-presidency, vacated by the elevation of Shearson to the higher office. Dudley Olcott, 2d, was re-elected treasurer, and W. A. Edwards was confirmed in his position as secretary.

He had dared to oppose the change in the bylaws taking the election of officers from the members and giving that power to the governors, and apparently for good measure the steam roller was run over Morrell a second time when the committees were made up. He was eliminated as chairman of the contest committee, which office he had held for several years, and none other than William K. Vanderbilt, Jr., who, it was supposed, had retierd from activity, was named in his stead. Vanderbilt's colleagues are Henry B. Anderson, W. W. Miller, C. L. Riker and James A. Blair, Jr.

The other committees are as follows :

Executive: Henry Evans, chairman; Colgate Hoyt, vice-chairman; Henry Sanderson, Dave H. Morris, and President Frederick W. Whitridge, ex-officio.

Membership: Edward Shearson, chairman; A. J. Hemphill, Colgate Hoyt, Henry Sanderson, Henry B. Anderson, William W. Miller, William L. Rich, Dave H. Morris, William K. Vanderbilt, Jr., Frederick D. Underwood, Henry R. Taylor, James A. Blair, Jr., Hamilton F. Kean, and George S. Brewster.

Contest: William K. Vanderbilt, Jr., chairman; Henry B. Anderson, W. W. Miller, C. L. Riker and James A. Blair, Jr.

Technical: Frederick R. Hutton, Sc. D., chairman; J. W. Lieb.

Good Roads: A. R. Shattuck, chairman.

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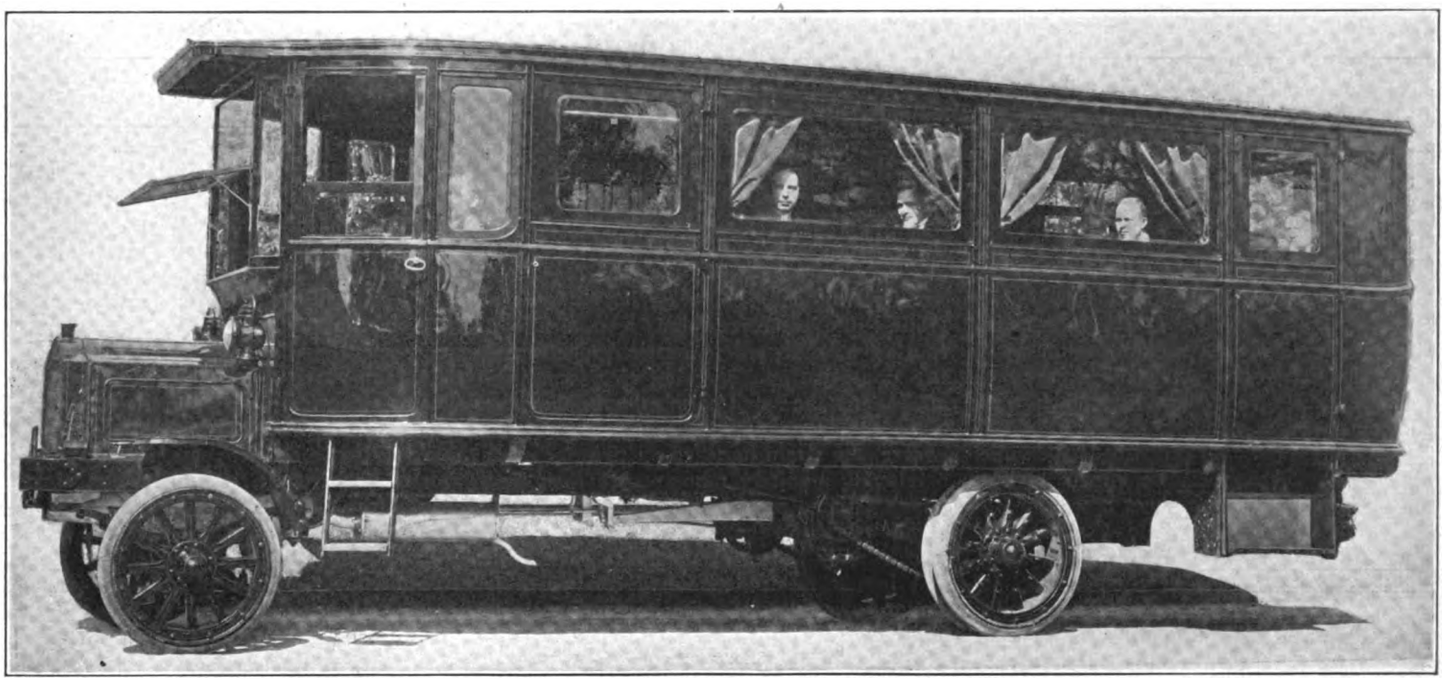
CAR DESIGNED FOR QUICK AND DEAD

Pittsburgher Has Vehicle Which Carries Coffin, Pallbearers and Mourners—Equipped With Telephones.

The distinction of being the largest funeral coach in the world, as well as one of the largest passenger-carrying motor cars that has been built, is claimed for a vehicle that just has been completed by L. Glesenkamp, Sons & Co., of Pittsburgh, Pa., for J. J. Flannery & Bro., of the same city. As the illustration shows, the car is a huge one. In addition to the space set aside for carrying the casket, there is room for 32 persons, including the chauffeur; the main passenger space is divided into two compartments, one for the mourners and the other for the pall-bearers. There also is a separate place in the casket compartment for flowers. The completeness of the car is such that an entire funeral of the ordinary size may be accommodated in comfort from the beginning to the end of the ceremony, the mourners riding in the strictest privacy and with protection in all kinds of weather.

In the matter of luxuriousness of finish and completeness of equipment, the big machine is notable. The upholstering is done in dark blue leather, with deep, soft seats and spring backs, and the floor coverings are of linoleum and maroon carpet. All glass is beveled plate. In addition to the electric lights and electric fans, which are rather necessities than luxuries in a car of this type, there are telephones establishing connection between the different compartments, the wiring required for the lighting, fan and telephone work being some 500 feet long. There is a complete lavatory, with water cooler, wash stand and other conveniences, in true Pullman car style, so that the passengers are as well provided for as if they were travelling on a train. The interior woodwork is of solid mahogany, finished in oil. The exterior finish is dark blue with azure striping and black mouldings.

The length of the car over all is 25 feet 7 inches, and from the dash to the rear end 21 feet 2 inches. There is a clear height in the passenger compartments of 6 feet 6 inches. The interior width at the casket compartment is 7 feet 3 inches, and the width of the casket compartment door is 34 inches.



THIRTY-TWO-PASSENGER FUNERAL COACH WHICH HAS TELEPHONES AND PULLMAN CAR LUXURIES

While this capacious body—which is mounted on a Packard chassis—was designed and constructed primarily as a funeral coach, the possibilities of such a car for work of a more cheerful character have not been overlooked, and the finish and general appearance are such that it can be used for any work where the transportation of a number of persons is desirable. The funeral arrangements, while complete, are so arranged as not to be obtrusive at any time, and the comfort, not to say luxury, of the equipment adds to the suitability of the car for what may be called pleasure service.

Packard Adds a Five-Ton Truck.

Supplementing the two-ton truck which was added to its line in January last, the Packard Motor Car Co., of Detroit, has further rounded out its productions by the addition of a five-ton vehicle. The complete line now includes vehicles of 2, 3½ and 5 tons capacity. Except that the new model is larger throughout and is equipped with a more powerful motor, the rating being 40 horsepower and the bore and stroke 5 and 5½ inches, respectively, it is similar to the smaller trucks and embodies all their distinctive features, not excepting a speed limiting governor which prohibits a greater speed than 8½ miles an hour. The wheelbase of the standard model is 168 inches, though optional frame lengths permitting loading space behind the driver's seat of from 12 to 16 feet are provided.

Camera's Aid in Choosing Equipment.

The camera as an aid in choosing equipment for motor cars recently was called into successful use at the Pierce-Arrow plant at Buffalo. It was necessary to make a choice between several kinds of headlamps, and road tests at night were not considered infallible in result, because of the possibility of differing weather conditions. So the camera was brought into play. On the night of the test a large screen was placed against a blank wall and the car from which the test was made was stationed some little distance away, facing the screen. The camera was placed in a fixed position. As each set of headlights was fixed to the supports on the car and the lights switched on, two photographs were made—one of the screen alone, to show the projection of the lamps' rays, and the other of the ground between the lamp and the screen, to illustrate the diffusion. All the exposures were made under exactly the same conditions, the plates were all developed together, and the prints made together. In this manner the resulting photographic prints gave an accurate idea of the comparative lighting power of the various lamps tried out.

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ECHOES THAT GO BACK 500 MILES

Being Some Observations and Reflections of the Famous Race on the Indianapolis Brick-Paved Speedway.

Of all the surprises attendant on the running of the 500-mile sweepstakes on the Indianapolis Speedway on May 30th, none was so great as the almost utter inadequacy of the scoreboard system. The lapse appeared the greater because of the near-perfection of all other details. On the board, there were eight places marked in numerical order, intended to show the positions of the first eight men at every 20-mile stage of the race, but only the time of the leader was posted, and there never was a time during the long race when the positions of more than four men were indicated. Why such an unsatisfying system should be followed is one of the things that is as difficult to discover as the reason why the tabulated times taken by the automatic apparatus were not obtainable either at the track or at the official hotel late in the evening, when the referee was besieged by newspaper men for the detailed times. He frankly admitted that he did not know when they would be available, and, as a matter of fact, they never did become available except to a newspaper man who happens to be a member of the A. A. A. contest board. It is known that while others were making frantic efforts to obtain a copy of the time sheet it was in his possession, and he held it long enough to prevent its use by any other newspaper. The inability of other newspaper men to obtain information concerning the detailed times while this particular journalistic member of an A. A. A. committee was permitted to take possession of it contains some elements of scandal, of which an investigation has been asked.

The Mercedes car with which Ralph De Palma won fame and so nearly won the chief prize in the 500-mile Sweepstakes race on the Indianapolis Speedway on the 30th ultimo is owned by E. J. Schroeder, the New Jersey sportsman, who has made a reputation as a motor boat enthusiast with the Harmsworth cup defenders "Dixie I, II and III." It is the same car De Palma drove into third place in both the Vanderbilt cup and the Grand Prize races last November. As this is the third time De Palma has gone down to defeat in the same car, he is frank in his hope that the "jinx" at last has been laid low.

Incidentally, the car sounded like a big motor boat when it limped around the course in the 197th lap with only one cylinder doing duty, reference being made to the single-cylinder of the "put-put" variety, of course. Nor was De Palma's mount the only one emitting sounds at times that were more or less nautical. Both Jenkins in his White and Dingley in his Simplex pulled up at the pits with rear tires flapping in a manner that might have suggested anything from a motor boat to the scenes behind a closed door when some fond parent had decided that to spare the rod would spoil the child. Instead of coming off the rims, as did most burst tires, or of staying on the rims, in one instance on each car the tire slipped partly off the rim between the wheel and the car. The valve held it in place and, as it circled around, beating a tattoo on the track, the mechanics shielded their respective drivers with outstretched arms.

"It's curious how quickly accidents happen, isn't it," half queried one of the occupants of the press stand. "Huh!" grunted his companion, "that's why they are accidents; otherwise they would be results."

If there is one thing which should impress itself indelibly on the minds of those who saw the race, it is that there can be no doubt of the effect of fast driving on tires. The way the tires went to pieces under the terrific strain was an object lesson in itself and should go far toward instilling into receptive minds a modicum of caution with regard to touring speeds and tire conservation. Smoking tires were realities, and the smell of burning rubber was plain to even a highly tilted nose. Of course, the strain imposed on tires by track driving is infinitely more severe than that which obtains in ordinary touring. But it stands to reason that the tires on a car that is habitually driven at moderate speed will last longer than those on a car which is driven by someone with a penchant for passing every other car on the road.

In one respect the race was noticeably different from last year's. Whereas, in the first race, several of the drivers made their rounds in "single blessedness," so to speak, this year every driver was accompanied by a mechanic. But the mechanics did not always sit at the left of the drivers. Both the Case cars, which were driven by Disbrow and Herrick, and Johnny Jenkins's White were of the left drive variety.

The "pits," as the underground supply stations have come to be known, and which were not pits at all but were boarded-in spaces on the infield side of the track, resembled miniature accessory stores and repair shops, as usual. As soon as a car came to a stop, tools flew through the air propelled by the hands of pit attendants. Probably the organization at the National station was the best drilled on the track, for there never was any hunting for tools, as there was at some of the other stations. Some system of signalling had been adopted, and immediately a car drew up, the mechanic found everything in readiness and lost the least possible time. And the caution. With but few exceptions, fuel was decanted from barrels into 10-gallon milk cans with very wide mouths; oil was stored in similar receptacles. When a car stopped way gasolene and oil was handled was a an immense funnel was inserted in the filler hole of the gas or oil tank and the mechanic lugged out a big can of the "needful" in his arms and poured most of it into the tanks. The rest of it went over the drivers, who remained seated and who didn't seem to mind in the least their impromptu bath.

When Bert Dingley came to the pits on his 95th lap with his Simplex belching more smoke than usual, spectators were given the opportunity of witnessing just how easy it is to extinguish a fire. The hood was yanked up and two squirts from a hand extinguisher sufficed to cool the ardor of the fire, which had originated in the carburetter.

Regarding celerity of changing tires, Hughes "had it on them all," to drop into the vernacular. His pit attendants had two jacks that were different from anything else on the track, and the speed with which the car could be lifted and a new wheel put on in place of the one carrying the "empty" tire was nothing short of remarkable. The jacks were simply long poles—probably 15 feet long—and to use one of them a mechanic inserted one end under the car axle and lifted the car by main strength; a hinged leg then dropped down and supported the weight, leaving the mechanic's hands free. It was a simple matter to push the car off the jack, which then fell flat and allowed the car to pass over it. At the White supply station an ordinary jack was used, and probably accounted for quite a little lost time.

Just after Dawson had finished the race a long howl went up from the grandstand, and it was several minutes before the information could be conveyed to the so-called "scorers" that they were the cause of the demonstration. Nearly all of them had removed their coats during the continuance of the race, and while they were waiting to be relieved of further duty for the day several of them absent-mindedly slung coats over the numbers, the top of the score-board being the most convenient "coat-rack." They looked surprised and hurt when they were asked to uncover the scores.

New York Orders "Tags" for 1913.

The contract for New York's 1913 registration plates has been awarded to the Manhattan Supply Co., of New York, by Secretary of State Lazansky. The colors of the plates have not been definitely settled, but in all probability they will be blue and white. The plates also will be of baked enamel instead of fused enamel, as are those at present in use, and which crack and break easily.

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27 FATHERS FOR ASSEMBLED "SIX"

New Grant Car Draws for Components on Many Factories—"Double Guarantee" a Feature.

Specialization, in the broadest sense of the word, and in the sense that modern products have put upon it, may be taken to signify quantity production of individual parts of rare excellence. From which it follows that the completion of the definition from an engineering point of view requires the addition of a semicolon and the single word standardization. It is around these two words, specialization and standardization, that the Grant Six, which is the last entry into the field of pleasure cars, is built.

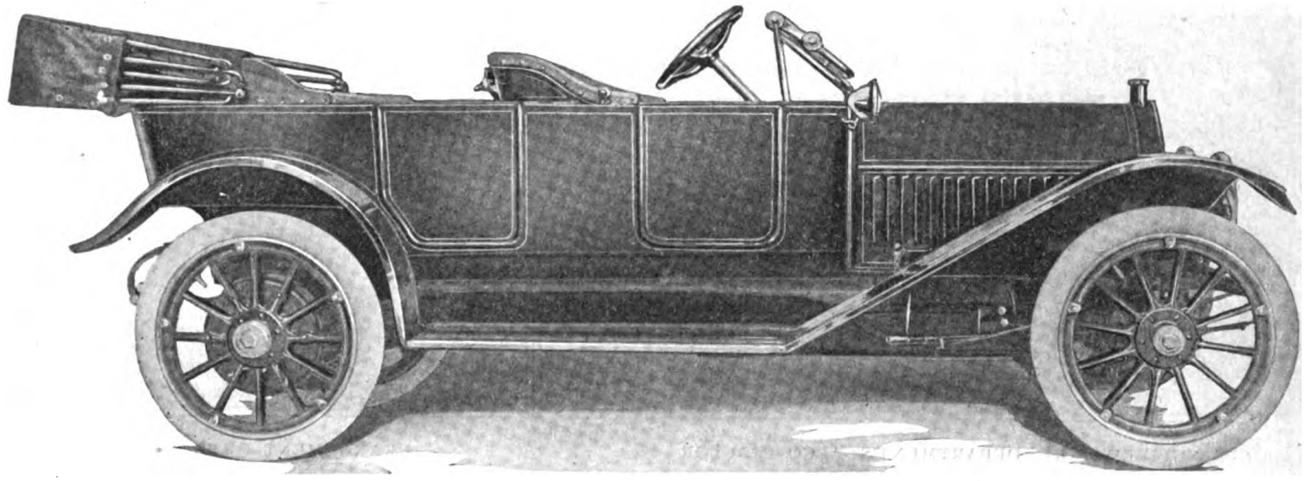
Nominally, the car is the product of the recently organized Grant Motor Car Co., Cleveland, O., though specifically it is the product of some 27 individual manufacturers. Which is to say, the car as a whole is assembled, and given its final touch and pat, so to speak, by the Grant Motor Car Co., which is close kin to the Grant-Lees Machine Co., of Cleveland, whose gears and other parts have acquired a reputation for excellence. Each separate part, however, is manufactured by a recognized specialist, and the complete list of names that is linked with the Grant Motor Car Co. is one of which anybody justly might be proud. And that the Grant Motor Car Co. is proud of the list is evidenced by the fact that, instead of taking all the glory for the complete assembly upon itself, it is at particular pains to emphasize the already recognized importance of the various manufacturers and the prestige which their products lends to the whole. It is because the car thus is made up of standardized parts that it has been designated the "specialists' car" with "the doubly guaranteed car," which conveys its own significance, added as a sort of middle name; the parts makers and the Grant company combine in the guarantee.

The list price of the new car complete with touring body, top, windshield and speedometer and such other equipment as usually is included under the heading "full equipment," is $2,750. Heading the list of the 27 notables whose products go to make up the car is the Wisconsin Motor Mfg. Co., Milwaukee, Wis., whose product supplies the power, the same being in the form of a 50-horsepower, six-cylinder T-head motor of the latest type. Needless to say, both the clutch, which is of the multiple disk variety, and the change speed mechanism are the products of the Grant-Lees Machine Co. The clutch is made up of 28 steel disks, 14 of which are faced with "Non-Burn" friction material. The whole is enclosed in a dust-proof casing and operates without lubrication. The change speed mechanism provides three speeds forward and reverse, selectively obtained, the gears being made of 3½ per cent. nickel steel and the shafts being carried in imported F & S ball bearings. The motor, clutch and change speed mechanism are mounted together in the chassis as a unit, increasing the rigidity of the whole and facilitating removal for inspection, overhauling or repair. Ignition is effected by means of an Eisemann high tension magneto, which is supplied by the Eisemann Magneto Co., New York City.

Both the front and rear axles are the products of the Timken-Detroit Axle Co., Detroit, Mich., the bearings, of course, coming from the Timken Roller Bearing Co. The rear axle is of the full-floating type and carries both sets of brakes, the drums being 18 inches in diameter. The frame is manufactured by the Hydraulic Pressed Steel Co., Cleveland, O., which company long has specialized in this particular branch of the automobile industry, and is mounted on three-quarter elliptic rear and semi-elliptic front springs from the Canton (O.) plant of the Cleveland-Canton Spring Co. Wheels are 36 inches in diameter and bear the name-plate of the Hayes Wheel Co., Jackson, Mich.; they are equipped with demountable rims. The body is of three-ply wood construction throughout, and is supplied by the Detroit Carriage Co., Detroit, Mich.

Throughout all the rest of the car, the same careful choosing of the best available products is in evidence. Thus, for instance, drop-forged control levers are from the Otto Konigslow Mfg. Co., Cleveland, other forgings coming from Wyman & Gordon, Cleveland, and steel castings from the Michigan Steel Castings Co., Detroit. The radiator is a Fedders, manufactured by the Fedders Radiator Co., Buffalo; the carburetter is a Marvel, which is the product of the Marvel Carburator Co., Indianapolis; the Warner Instrument Co. scarcely requires introduction as the manufacturer of the speedometer; Gray & Davis, Amesbury, Mass., supply the lamps; the windshield is the product of the Superior Mfg. Co., Ann Arbor, Mich., and is full nickel plated and of the rain-vision type; 3½ per cent. nickel steel universal joints and shafts are supplied by the Hartford Auto Parts Co., Hartford, Conn.; the Gray & Hawley Mfg. Co., Detroit, supplies the muffler; spring bolts are supplied by the Bowen Mfg. Co., Auburn, N. Y.; drag links are manufactured by the Cincinnati Bell Crank Co.

In addition to making a complete car of the various products which have been enumerated, the Grant Motor Car Co. manufactures all the sheet metal parts, such as fenders, tool boxes, etc., manufactures the top from products obtained from W. A. & J. C. Haartz, builds the upholstery from selected leather and curled hair and completes the paint work, the products for this part of the operation being supplied by Valentine & Co. and the Murphy Varnish Co., Newark, N. J. The tires are 36x4 and bear the well-known Diamond imprint; and last but not least, a complete electric lighting system, manufactured by the Esterline Mfg. Co., Lafayette, Ind., forms part of the standard equipment.



GRANT "SIX" IN FIVE-PASSENGER TOURING CAR FORM

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ALCO BRINGS OUT "FIFTH WHEEL"

Modified Application of Old Idea in New Fire Truck Tractor—Method of Mounting an Unusual Feature.

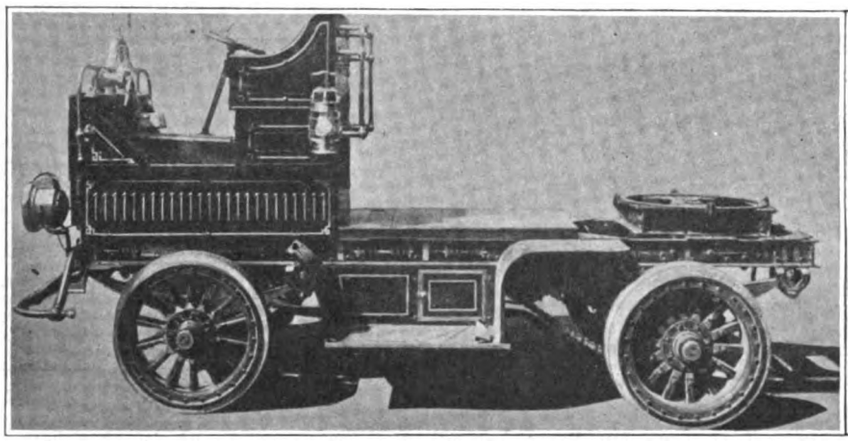
Of the two more or less common methods of increasing the transportation capacity of commercial vehicles without the necessity of unduly increasing the weight of the vehicle itself, applications of the tractor idea appear to be gaining in popularity, which is not altogether surprising, in view of the many advantages of the system over others. For instance, to increase capacity by the simple expedient of adding a four-wheel trailer is perhaps the easiest solution of the problem, though if viewed from every angle it may be no solution at all. At best, however, such systems incline to inefficiency in that they are difficult to handle in traffic, and it is doubtful if their popularity ever will be very great.

Such is not the case with adaptions of the tractor idea, however. With a tractor and two-wheeled trailer part of the load may be distributed on the tractor and part on the trailer, or the whole of the load may be carried by the trailer, leaving the tractor free and thus decreasing maintenance expense due to the carrying of excessive loads, assuming, of course, that at least two-thirds of the weight is carried by the trailer. It may be seen that the tractor then would not require to be as heavy in proportion to the load transported as would a truck on which the whole weight is carried. Incidentally, the tractor with trailer is easily handled and presents no particular difficulties either in traffic or on open country roads.

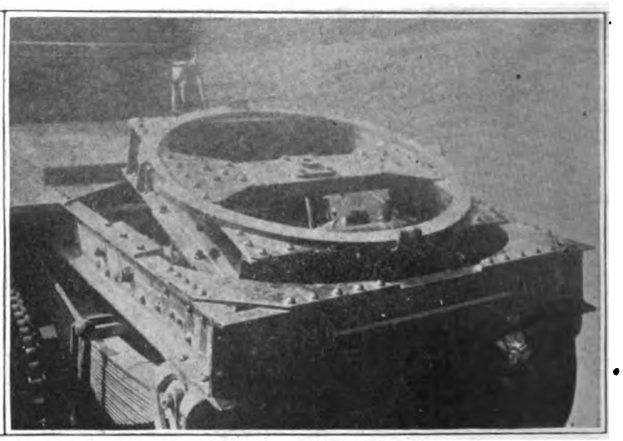
Correct design of both is essential, of course, and in this respect the necessity for providing the requisite amount of flexibility between tractor and trailer without sacrificing either strength of adequate bearing surface between the two is of prime importance. In attacking this problem, the American Locomotive Co., Providence, R. I., has modified the familiar "fifth wheel" which is common to horse-drawn vehicles in a manner which is unusual and which gives every indication of overcoming the difficulty with the minimum complication and the maximum efficiency. The idea is incorporated in an Alco tractor which just has been delivered to the Fire Department of Schenectady, N. Y., and is shown in the photographs which are reproduced herewith, one picture showing the tractor complete and the other showing the "fifth wheel" more in detail.

As may be seen by the pictures, the "fifth wheel" is mounted over the rear wheels of the tractor, and thus leaves considerable space directly behind the driver's seat which may be utilized for carrying auxiliary apparatus, such as hand extinguishers, etc. The wheel itself is orthodox, except that its construction is considerably heavier than is usual; its mounting, however, is unusual. In order to permit of the necessary flexibility, as when the trailer drops into a declivity in the road, for instance, the "fifth wheel" is mounted on a heavy transverse shaft, which is carried at either end in bearings on the chassis frame.

The tractor is of standard Alco construction, the wheelbase being 110 inches and the over-all length being 178 inches. It is equipped with a four-cylinder motor, the bore and stroke being 5 and 6 inches, respectively, and is carried on 36x5 single tires in front and 36x4 dual tires in rear. The front springs are 47 inches long and those in the rear are 54 inches long. Though the tractor was designed primarily for service in moving a hook and ladder truck, its adaptability for other work in which the advantages of the "fifth wheels" idea are available, plainly is apparent.



SPRINGFIELD FIRE DEPARTMENT'S ALCO TRACTOR



ARRANGEMENT OF "FIFTH WHEEL"

Big Bus Project Planned for Montreal.

If a franchise can be obtained, the Canadian city of Montreal soon will have a motor bus service which, according to the promises of the promotors, the Autobus Co., should leave little to be desired. It is proposed to maintain a fleet of no less than 2,286 buses constantly in operation, with a reserve fleet of 64 for emergencies. Four months will be required to get the first 25 buses in operation, after which 25 are to be added every month until the whole number is in operation. The total investment is estimated to be in excess of $5,000,000, and it is expected that some 2,000 employees would be required. An exclusive 10-year franchise has been asked for.

Where Improvements Must be Looked for.

"What is urgently needed for automobile use," says the Motor News, advocating a type of motor for which no small number of inventors has striven in vain, "is a constant compression engine." "A motor working at its full load," continues the foreign paper, "is immeasurably more efficient than when running on a very small load. This is due to the way in which the control of the engine is arranged; the throttle controls the volume of combustible mixture entering the cylinders; therefore, when running on a small throttle opening, the cylinders are getting a greatly decreased charge, and yet the compression space remains at the same size, so that the compression is much reduced, thereby considerably detracting from the efficiency. . . . When one comes to seriously consider this matter of the improvement of the car, it becomes evident that it is chiefly in the engine and the transmission that we must look for improvement. The former is, however, the more important of the two, and doubtless in a few years' time it will bear but small resemblance to the motor of the present day in the best cars, at least. Whatever happens, this much is certain: it will be considerably cheaper to run a car in a few years' time than it is now."

Appealing to "Rajas and Gents."

"General orders executed promptly to rajas, merchants and gents" is one of the attractions held out by a firm in India which is seeking American automobile accounts.

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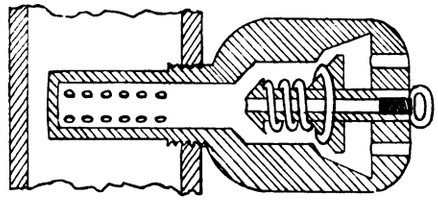
INCREASING THE CARBURETTER'S EFFICIENCY

Auxiliary Devices That Indicate the Limitations of Spray Type—Mechanical Mixtures Differentiated From Real Vapors in the Making and in Combustion—Contrivances, Simple and Otherwise, That Break Up the Globules and Make for Better Service and Greater Economy.

While it is true that the efficiency of a gasolene motor is dependent upon its design and workmanship, in that a motor with inadequate valves and inaccurately machined working surfaces, for instance, never can be truly efficient, no matter what may be the other conditions, it is equally true that within the limits set by structural considerations the motor is dependent for its efficiency upon the characteristics of the fuel that is supplied to its cylinders for combustion. The power of a gasolene motor is the power developed by the sudden expansion of the ignited mixture, minus the internal wastes incidental to the transformation of this power into a form that permits its application to the turning of the wheels of a motor car. The expansive power of a charge of carburetted air—that is, the volume it would attain if allowed to expand unconfined, or the pressure it would generate if confined—is dependent upon the thoroughness of the burning of the combustible elements, as is also the speed with which combustion is effected. Obviously, the more thorough the combustion the smaller the quantity of fuel required to liberate a given amount of heat, or produce a given pressure.

There are two prime requisites in the production of the mixture. The proportion of gasolene to air must be correct and the gasolene must be thoroughly mixed with the air. A motor will not run at all unless the proportions of gasolene vapor and air are correct within certain well-defined limits, but if air and gasolene in the proper proportions are sufficiently mixed so that they will travel together through the intake manifold and enter the cylinders, the motor will run and perform work. These facts made it compulsory for carburetter designers to concentrate their attention upon the problem of producing devices that would mix together the proper proportions, as nearly as possible, regardless of motor speed and other conditions—manifestly a task of no small magnitude, as the innumerable host of carburetting devices in existence goes to show—and, to some extent, it would seem that the second consideration, that of the thorough mixing of the two, has been neglected. That there are excellent reasons for this cannot be denied. In the solution of any problem it is natural and proper that the more essential details should be given first attention, leaving less vital points to be taken up later. As motors would not run at all without something like a properly proportioned mixture, it followed that the first thing to do was to obtain such a mixture, leaving the matter of homogeneity to be dealt with when the necessity for greater economy and detailed refinement became manifest.

What with the demand for extreme power for given cylinder dimensions, for clean and ordorless combustion and, last but not least, for low gasolene consumption, in order to compensate somewhat for the rapidly soaring price of fuel, the time seems to have arrived when the problem of producing a truly homogeneous mixture must be attacked and solved. Already a number of more or less ingenious and more or less efficacious methods have been evolved, and the results that have been obtained are indicative, in no uncertain way, of the correctness of the theory that a truly homogeneous charge is conducive to an economy that is little short of amazing when compared with the work done with less perfect mixtures.



SPEEDO

The fundamental principle involved is a simple one. If the gasolene and air are so thoroughly commingled as to be truly a homogeneous mixture—that is, that they will be essentially a single substance rather than a diffusion of microscopic globules of gasolene suspended in air—the gasolene will burn with all the speed its nature permits, and it will burn with absolute thoroughness. This means that its full quota of heat will be liberated and, therefore, that the maximum pressure will be attained. On the other hand, a mixture that is not homogeneous, that consists merely of a fine spray of gasolene in air, cannot burn in the same way because the separate particles of hydrocarbon, though exceedingly small, act in their minute way just as any large mass of combustible material would act. They become ignited on the surface and burn toward the center, just as does a piece of wood thrown into a fire. The greater the mass, the longer the time between the ignition of the surface and the center. If there is not sufficient time between ignition and exhaust for the globules to finish burning all the way through, they will be liberated still burning, or partly burned and still odorous. The smaller the particles the more rapidly they will burn, until, when they no longer are particles, but enter a gaseous state and thus are all surface, so to speak, the speed of combustion reaches its maximum.

The standard type of carburetter, in which a spray of gasolene is sucked into the air as it passes to the cylinders, produces what is essentially a mechanical mixture of fine globules of gasolene. True, in some carburetters the spray is finer than in others and the conditions under which the mixture is produced are more conducive to fine division and partial evaporation than others. The fact remains, however, that most spray carburetters produce a mechanical mixture and not a truly homogeneous gas. Curiously enough, it is necessary, in order to find the type of carburetter producing the most homogeneous mixture, to go back to the old-fashioned wick carburetter, in which there was no spraying, but air was drawn through wicking saturated with gasolene, and took up the hydrocarbon, by evaporation, as a true vapor, and not in small globules. While such carburetters were possessed of innumerable and unpardonable disadvantages, they certainly had the virtue of producing a gas that would burn thoroughly and produce power economically, and the mileages made by some of the old time cars with wick carburetters and hot-tube ignition were remarkable, when mechanical crudity and inefficiency are taken into consideration. The advantages of the modern type of spray carburetter, however, are too great and too numerous to sacrifice, so the obvious thing is to add to the carburetter some means of breaking up the gasolene globules before they reach the cylinders.

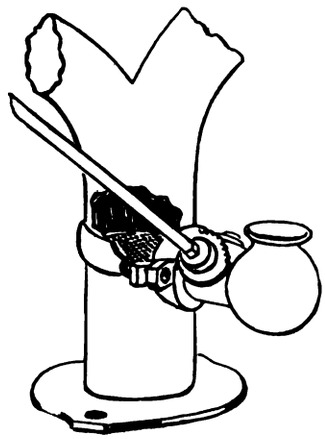
Apart from the familiar plan of heating the carburetter or the main air supply for the purpose of furthering evaporation, there are several ways in which it has been sought to improve the mixture. One is the introduction of air currents at an angle with the main current, and another the use of mechanical means for literally beating the particles of gasolene into a vapor. As the first type involves the addition of air to the mixture already formed in the regular way in the carburetter, and as the volume passing to the motor changes according to the requirements of the motor at various speeds, it follows that there must be some means for correspondingly regulating the

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admission of air through the added appliance, and in all cases this is done. It is a fact, however, that bears out the theory upon which these devices are based, that the quantity of gasolene sprayed into the air by the carburetter is smaller, in proportion to the total volume of air, than it would be without the attachment, indicating that a smaller proportion of gasolene will do the same work if properly vaporized.

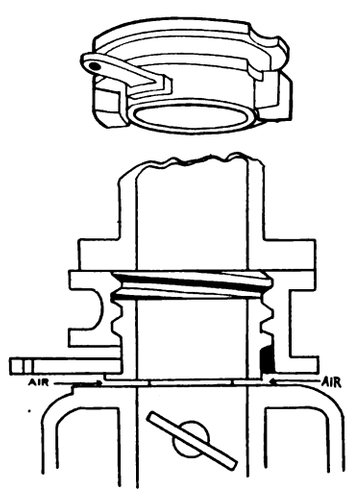
A typical device of the automatic air-jet class, having automatic proportional control, is the Speedo, made by the Fulton-Grubb Co., of Chicago. This consists of an air inlet valve which is screwed into a hole drilled and tapped for the purpose in the intake manifold just above the carburetter. An air pipe extends into the manifold—in fact, almost across it—and through this the extra air is delivered, not through the end, which is closed, but through a series of small holes in the sides, so disposed that numerous small air jets are projected into the main air current approximately at right angles to it. The effect is to violently interrupt the smooth onward flow of the globules and break them up by impact of the many air jets, by dashing them against the manifold walls and by the better evaporation afforded by the extra air. The opposite end of the device, which is outside of the manifold, encloses an automatic controlling valve which, as the illustration shows, is arranged so that it operates in a manner the reverse of the ordinary variety of automatic valve. It is normally held off its seat by a helical spring, so that the maximum air volume can pass. A partial vacuum within the manifold tends to draw the valve toward its seat, and as the walls of the chamber taper in that direction, the air that passes diminishes in volume as the suction of the motor increases. When the vacuum is maximum, as when the motor is running slowly on almost closed throttle, the valve is drawn down on the seat, no air passes, and the device is inactive. The effect of this arrangement is to permit the formation of a somewhat rich mixture for starting with the throttle partly closed and for running slowly; but the opening of the throttle reduces the vacuum in the manifold and consequently allows the air valve to open and admit more air, which, however, cannot be said to dilute the mixture, for it has the effect of making available a greater quantity of the gasolene that already is there. To illustrate the point, suppose that a quantity of salt is lying at the bottom of a vessel of water. The water will be salty, but if a jet of water is introduced so as to forcibly stir up and dissolve the salt in the bottom, the water will be saltier than before, notwithstanding the added water.

Depending upon the action of a jet of extra air introduced above the carburetter, but embodying hand control instead of automatic functioning, the Michener gasolene saver, made by E. S. Michener, of New Castle, Pa., is attached to the intake pipe above the carburetter by drilling a hole in the pipe and clamping the device over it, suitable brass clamps being supplied for the purpose. The air is admitted through a globular chamber with its opening on top, and regulation is effected by means of a valve which is retained in position by a spring detent. A rod of suitable length passes upward and backward through the dashboard and terminates in a convenient handle, and by this means the volume of



MICHENER

extra air admitted is regulated by the driver so as to obtain the best results under existing conditions. A screen of wire gauze in the intake pipe assists the air jet in breaking up particles of gasolene. The globular intake is useful also as a priming cup.



STEWART

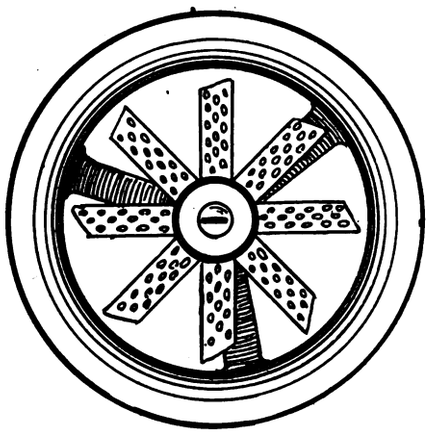
Manual control of the auxiliary admission of air to the mixture as it leaves the carburetter is a feature of the Stewart gas saver also; this device is manufactured by the Alfred C. Stewart Machine Works, of Los Angeles, Cal. As is usual in devices of this type, it is designed to be located between the carburetter and the manifold flange. The air intake openings are arranged radially, so that when the valve is opened the air is admitted all round in a thin sheet tending to converge at the center of the intake pipe, but, of course, being carried upward by the currents in the pipe. The breaking up and mixing effect of this arrangement is marked. As it is not always possible to drop the carburetter the inch that is required for the Stewart appliance in its standard form, another model is made which is designed to screw into a hole in the intake manifold, and so does not necessitate the moving of the carburetter. In this case the valve is of the piston type, actuated by Bowden wire control from the steering wheel column, and in its travel successively opens ports which admit more and more air as the valve is opened wider.

While differing from the devices already referred to in many respects, the auxiliary air supply arrangement of the Climax carburetter, manufactured by the Bingham Mfg. Co., of Cleveland, O., belongs to the same general classification, because it is designed to admit the extra air supply above the carburetter proper, and this air, entering the current of mixture at right angles to its flow, has a decided effect in assisting in the evaporation and mixing of the fuel. As the illustration shows, the air is admitted to an annular passage surrounding the outlet of the carburetter, of which it is an integral part, and not a separate attachment. Air holes at diametrically opposite points in the pipe admit the extra air; there is no other auxiliary air inlet. The most striking feature of this device, however, is the air valve, which is of the automatic type. The valve is formed of a strip of thin sheet metal of the proper thickness and of springy temper, part of which is rolled around a mandrel until it assumes the form of a clock spring of greatly exaggerated width; the coils do not come in contact with each other at any time. Part of the strip is left flat. The mandrel around which the strip is wound is mounted in the valve chamber, as shown, and is fixed in the walls of the chamber, its position being adjustable, however, in that it can be turned on its axis. The part of the strip left flat projects and covers the air inlet, and the spring effect of the coil keeps in pressed against the inlet with a force that can be regulated by turning the mandrel so as to tighten or loosen the coils, again in the manner of the winding or unwinding of a clock spring. The suction of the air draws the flat valve away from the air inlet and the spring, of course, tends to pull it back. As there are no moving parts in contact, it is obvious that there is no friction, the result being that the valve is extremely quick and sensitive in action, responding instantly to minute changes of suction. There are no wearing parts, and the only way the valve itself can get out of adjustment is through change in its own form, which is not at all likely to occur. Changes of adjustment made necessary by changes in the adjustment of the carburetter proper are readily made by turning the mandrel one way or the other.

Of the class of carburation-improvers that is entirely mechanical in action, that is automatic, requiring no attention after in-

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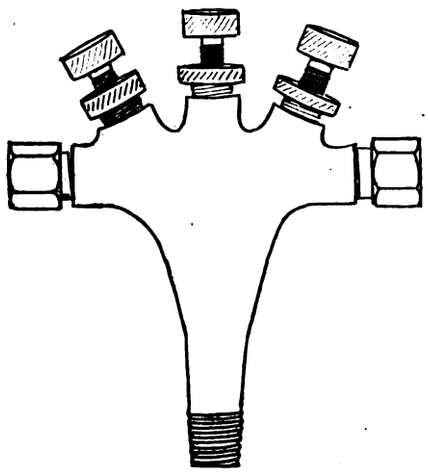
stallation, and is concerned solely with the better mixing of the gasolene and air coming from the carburetter, the Gyrex, made by the Royal Equipment Co., of Bridgeport, Conn., is a good example. The Gyrex is nothing but a little seven-bladed fan, much like an ordinary cooling fan in miniature, mounted on ball bearings in a brass ring which is clamped between the flanges of the top of the carburetter and the bottom of the intake pipe. Due to the angularity or "pitch" of the blades, the fan is rotated at enormous speed by the rapidly flowing current of mixture, and its flying blades break up the particles of hydrocarbon with which they come in contact and mix the gas more intimately than would be possible without assistance. The blades are perforated, the holes forming, it is thought, additional striking surfaces for the destruction of gasolene globules and adding somewhat to the general turmoil which it is sought to produce.



GYREX

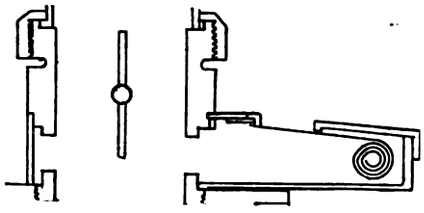
Still another device, and one that only recently has made its appearance, is the Thermo-gasket, the product of F. W. Battershall & Co., Albany, N. Y. As the designation indicates, it resembles a gasket in that it is a flat aulminum casting, half an inch thick and of the oval form usual to intake pipe and carburetter flanges. It is designed to be placed between the intake pipe and carburetter flanges, exactly as is a gasket. It is much more than a gasket, however, for it is hollow, forming a jacketing space around the central opening; on one side there is an inlet and on the other an outlet communicating with this space, so that either hot water or exhaust gas can be passed through the jacket. The opening through which the mixture from the carburetter passes is not smooth and round, like the piping, but has a number of teeth which project toward the center and which, moreover, are not set parallel to the axis of the pipe, but at an angle. The effect is to impart to the mixture a whirling motion, as it is drawn up through the "gasket" and, at the same time, the teeth form radiating surfaces from which the heat of the jacket is picked up by the mixture. The idea, of course, is to more thoroughly mix the gas by agitating it and to further evaporation by means of heat—the combined application of two principles of well known efficiency.

There would seem to be almost no limit to the forms and combinations that can be evolved, all having the same object in view but all differing more or less radically in their methods of doing the work, and another example is found in the "carburetter



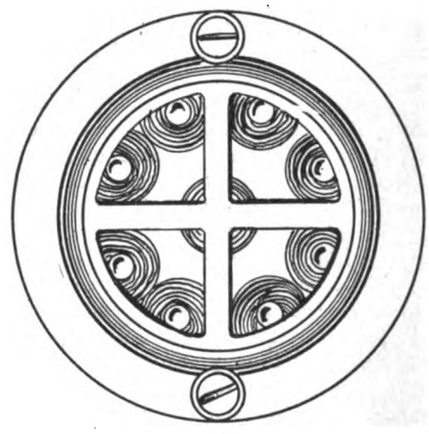
BINGHAM

gasometer," so called by its manufacturers, the Lattig & Townsend Sales Co., of 1431 Spring Garden street, Philadelphia. This utilizes the old and effective idea of passing air through a gasolene-saturated wick by placing in the usual position, between the carburetter and the intake pipe a screen composed of cotton wicking backed by wire gauze. The wicking tends to absorb solid particles of gasolene, and gives it out in the form of vapor, while the gauze adds its assistance in the breaking up and mixing process.



GUTERMUTH

Still another type of gasolene-saving and mixture-improving device takes into consideration the fact that while there is more or less vacuum at the spray nozzle, there is none in the float chamber, so that the gasolene level in the nozzle is not always at the point where it should be, according to the position of the float. The theory is that sometimes there is excessive pressure in the float chamber, so that the mixture is too rich, and at other times there is a lean mixture because there is not enough. Constructed according to this theory, the Phoenix gasolene saver, manufactured by Herz & Co., of New York, not only regulates the proportional pressure at the nozzle and in the float chamber, but also introduces auxiliary air above the throttle. The main part of the Phoenix is a brass column with a screened air intake at the top and a passage leading into the float chamber, into which the column is screwed. From the middle of the column a pipe leads off and is connected into the intake manifold, just above the throttle. The float chamber is made air-tight, so that no air can enter except through the gasolene saver. There is a cock in the column, just above the connection for the manifold, and another in the manifold connection. When the motor is running, air is drawn into the manifold through the brass column and the connecting pipe, and the tendency of the partial vacuum to draw the air out of the float chamber bears a definite proportion to the suction at the nozzle. By partly closing the cock in the column the admission of air is restricted and the suction on the float chamber increased, while the volume of air and the suction can be regulated simultaneously by means of the cock



AMERICAN

in the manifold connection. By the proper adjustment of these two cocks the gasolene level at the nozzle is maintained at the most efficient point at all speeds, while the extra air admitted not only helps in vaporizing the fuel, but adds air that represents a clear gain in fuel because it reduces the quantity of gasolene in proportion to the total volume of air.

The same underlying principle is involved in the "compensator" made by the Bingham Mfg. Co., of 227 Prospect avenue, N. W., Cleveland, Ohio. In this case, however, the details are differently carried out. The body of the instrument, which screws into the top of the float chamber, has two oppositely placed pipe connections, which are connected, by means of copper tubing, one to the main air pipe below the throttle and the other to the manifold above the throttle. Three little valves, operated by screws with knurled heads, control the areas of the three passages—one to the float chamber, one to the manifold above the throttle, and one to the air intake below the throttle. The three means of adjustment permit a very accurate setting of the instrument. Once set, the valve screws are retained by knurled lock-nuts.

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The real difficulty of making an automatic auxiliary air inlet that will respond rapidly and open to the correct extent with all changes in engine speed and power has resulted in the devising of a number of valves designed to take the place of the usual auxiliary air intake, with a view to producing better action at this point. Among these is the compensating valve manufactured by the American Compensating Valve Co., of Manitowoc, Wis. This valve is fitted over the auxiliary air intake of the carburetter, the original valve being removed and the compensating valve assuming its work. Instead of having a single large opening, as is usual in auxiliary valves, the American compensating valve has a number of small spring-controlled inlets which are quick to respond even to slight variations in the speed of the motor, while marked changes are taken care of by the simultaneous opening of as many of the ports as may be necessary to admit the requisite air to make a proper mixture.

While it manifestly is impossible to enlarge upon the relative merits of appliances of the classes described, it is an established fact that notable results in economy of gasolene, increased power and other evidences of clean and thorough combustion have followed the use of some, at least, of the many gasolene savers, carburation improvers, etc., that are for sale. The claims made by the various manufacturers run all the way from 15 per cent. to 40 per cent. in gasolene consumption. Some of the devices have special features in addition to their primary reasons for existence. For instance, the manually controlled auxiliary air valves placed above the carburetter and throttle can be opened wide and the throttle closed in descending grades, with the result that pure cold air is drawn into the motor. With the air valve wide open the motor cannot be started, so that the device forms a more or less effective lock for the car. The automatic devices lay reasonable claim to distinction in that once installation has been made there is nothing further to do—the appliances take care of themselves. But whatever may be the merits of the individual articles, and whatever may be the actual economies obtained from their use, there can be no question but that their inventors are on the right track in endeavoring to bring the gasolene motor to a higher standard of efficiency and to offset, as much as possible, the expense of operation due to the ever rising price of fuel.

Motorizing Brazilian Fire Department.

The municipal authorities of Bahia, Brazil, have invited bids for two automobile fire engines, two automobile ladder trucks, two automobile hose carriers, and two automobile ambulances, all to be fully equipped. The call for the bids was published April 20, and as it requires that the bids be submitted within 60 days, American manufacturers are excluded from competing for the order, which doubtless will go to one of the British or German firms.

MEASURES BOTH SPEED AND HILLS

Stewart & Clark Incorporate Radical Innovation in New Instrument—Speedometer Also Altered Inside and Out.

Though speedometers are so very common as scarcely to cause a second glance, and grade indicators, though not so common—at least, on American soil—still are far from being novelties, it has remained for the Stewart & Clark Mfg. Co., Chicago, Ill., which produces the Stewart speedometer, to combine the two instruments, and also an odometer, in the same case. Apart from this radical innovation, the new speedometer is quite different in every way



STEWART SPEED-GRADE INDICATOR

from the older Stewarts, as may be seen by the accompanying sectioned picture, the adoption of a new form of construction increasing its accuracy and durability and accounting for the absence of the familiar semi-circular dial and needle pointer. The grade indicating portion of the device operates mechanically and is positive, and it is expected that its intelligent use in changing gears on grades can be made a material factor in reducing wear and tear on the engine and the car for the reason that the tendency to make use of the proper gear will be encouraged by an exact knowledge of the grade negotiated.

One of the important features of the speed-indicating portion of the instrument is the magnet, which is of the closed ring type, and thus becomes its own "keeper" and increases its permanency. In the accompanying picture, A is the outer retaining cup or casing and B is the frame on which the parts are assembled. The permanent ring magnet (D) is mounted on the spingle or rotor (E) to which is geared the flexible shaft by means of which it is driven. Stepped in a cap and crown bearing (F) is the shaft (G) which carries the aluminum disk (H) on which are marked the graduations corresponding to the speed of the car in miles per hour. In operation, the balanced cup (H) is acted upon by the Foucault or eddy currents set up when the permanent magnet is rotated. The resultant torque or pull on the cup is directly proportional to the speed at which the magnet is rotated, and consequently indicates the speed at which the car is driven by means of the graduations on the numbered disk. The odometer portion of the instrument remains unchanged and is distinctive by reason of the elimination of all springs.

Affords Better Grip on Steering Wheels.

The familiar practice of winding friction tape around the rim of the steering wheel is ample evidence of the desire of many drivers for something that will afford a better grip than the smooth, polished surface of the wood or hard rubber generally used for such rims. In commercial vehicles in particular it is very desirable to have a sure hold on the wheel, and with a view to providing a grip that may be attached to any steering wheel and will afford a good grip but will not present the somewhat untidy appearance of tape, the Goodyear Rubber Hose & Packing Co., of 221 Chestnut street, Philadelphia, has brought out a rubber grip in the form of a covering made to fit over the rim. It is cemented in place and bound with bandages until the cement sets, which it will do over night; both cement and bands are supplied with the outfit. The grip is made long enough for a wheel of the largest diameter, and when applied to a smaller wheel it is cut and the edges brought close together before cementing. The grip, which is styled the "Steerease," is made of rubberized fabric.

Switch that Reduces Short Circuits.

By way of providing against the possibility of chance short circuits taking place in the ignition switch, the manufacturers of Buchet cars have adopted a type of switch that is more than ordinarily novel. In its simplest aspect it is merely a small cylinder formed of non-conducting material and containing a small quantity of mercury. The ignition wires are fixed one in each end of the cylinder, and to make the magneto inoperative merely requires that the cylinder, which is pivotally mounted, be tipped from a vertical to a horizontal position. This causes the mercury to immerse both the wires and thus short-circuits the magneto. The object of the switch is chiefly to provide against "shorts" caused by rain, and it is said to be impervious to shortage through other means than those provided internally.

Timken Offers Cash for Mileage Records.

Cash prizes to the amount of $200 have been offered by the Timken Roller Bearing Co., of Canton, O., for the persons reporting cars which have traveled the greatest number of miles on Timken roller bearings, either front or rear wheels, without repair or replacement, before August 31st next.

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DUMPING SEVEN TONS BY HAND

Big Coal Truck With Body Balanced So That One Man Tips It—Short Wheelbase Permits Quick Handling.

During the last year or two there has been considerable activity among manufacturers of motor trucks in turning out machines of the dumping type having the dumping mechanism operated by power applied in one or another of a dozen different and ingenious ways. Among the very newest dumping trucks, however, is one that, notwithstanding the fact that it has a carrying capacity of no less than 7 tons, is designed to be tipped by hand. The car, which is shown in the accompanying illustration, is the product of the Knox Automobile Co., of Springfield, Mass. The dumping mechanism was designed especially for this work.



KNOX 7-TON TRUCK WITH HAND DUMPING BODY

The reason why a single man can dump a full load with ease and expedition is that the load-carrying body is balanced near its middle and the operator does not have to raise any considerable weight. All that is necessary is to move the almost balanced weight until the center of gravitation falls back of the pivot, when the tipping is completed without further labor. For the same reason very little labor is required to bring the body back to the loading position. The hoisting mechanism used is of the geared windlass type, and is heavy and substantial, as is necessary in work of this class. The whole load is carried over the rear wheels, the panels being of heavy lumber and the interior re-enforced with sheet iron. A short wheelbase gives a short turning radius and facilitates handling in close quarters.

Where Money is Easy for "Nighthawks."

Whatever may be the attitude of the New York taxicab driver toward the affluence or the state of helplessness of those who burn the midnight gasolene, there is a law in Glasgow, Scotland, which makes it perfectly legal for a driver to charge double fare after the clocks chime 12 o'clock at night. The point was brought out in several cases which were tried simultaneously, the passenger in each case claiming that he had been unlawfully mulcted. Though the practice is legal, as was attested by the court, it is restricted to the smaller companies and to "nighthawking" owner-drivers. The larger motor cab companies have made it plain that single fare will be acceptable at any hour of the day or night.

Why Evansville Gets More Gasolene.

Fuel bills have taken a "drop" in Evansville, which is located in Indiana. Not that the price of gasolene has been reduced nor some cheaper fuel substituted. Gasolene still is used and the price per gallon is the same as heretofore, but, strange as it may seem, there is more of the liquid in a gallon, which accounts for the 2½ per cent. decrease in gasolene bills. According to a report which J. C. Wallenmeyer, inspector of weights and measures in the Indiana city, has made to State Commissioner H. C. Barnard, the five gallon measures which formerly were used by such well known firms as the Standard Oil Co., the Evansville Oil Co., and the Indiana Refining Co. were one pint "shy," and so they have been confiscated.

Juror's Friendliness Causes Mistrial.

Because a juror, Robert Johnson, of Johnsburg, N. Y., spent a night in the company of the complaining attorney's clerk, the Glens Falls Automobile Co. has been accorded an opportunity to save $500. The company was the defendant in a negligence action for $15,000 brought by Emma L. Taylor, of Bolton, N. Y., but a jury in the Supreme Court for Warren County last week awarded her only $500, which award was promptly set aside and a new trial ordered when the dereliction of Juror Johnson was brought to the attention of Justice Van Kirk.

GETS HIS FUEL FROM THE SEWER!

Engine in Australia Operated on Gas from Septic Tank—Possibilities Unfathomable, Also Questionable.

Probabilities and possibilities as to what will be the fuel which will supply the motor vehicles of the future have been discussed at great length, and it is not at all unlikely that if the price of gasolene soars another 56 per cent. within the next six or eight months the number of suggested solutions will multiply in proportion. Kerosene, distillate, denatured alcohol, liquefied natural gas, Pintch gas compressed in cylinders, each has been offered in turn as the most probable successor to "good old gasolene," and although with some of these fuels, at least, quite a saving can be effected in the cost of operation, the main difficulty is the inability to procure the substances with the same ease with which gasolene can be bought. In other words, fuels other than gasolene are not "stocked" by garage keepers, and until they are stocked, their development naturally will be slow.

If, however, the reports which come from the little town of Parramatta, New South Wales, can be taken without the proverbial grain of salt, common, ordinary sewer gas makes a fuel for the internal combustion motor which will stand comparison with the best of them, and which from the point of and the ease with which it can be procured, colloquially speaking, has gasolene beaten "coming and going." A small 2-horsepower motor, it is stated, has been operating for some time past using no other fuel than the gas which issued from the contents of a septic tank which forms a unit in the sewage disposal system of the town, and with such constancy is the gas generated and so uniform is its composition that not the slightest difficulty is experienced in obtaining perfect voltage regulation from a small dynamo.

Sewer gas, which is nearly all Marsh gas or Methane, with the chemical formula (CH), has a calorific value of 23,594 B. T. U. per pound, which is 30 per cent. greater than the calorific value of gasolene. The gas is produced wherever vegetable matter is allowed to decay, and the rapidity of production depends upon the composition of the materials and the temperature.

With a small "sewer gas" motor directly connected to a simple compressor which will serve to force the gas formed in the cesspool of a country estate into suitable storage tanks under high pressure, or possibly in the liquid state, and the evolution of the gas hastened by the addition of the proper chemicals and the application of heat from the exhaust of the engine, it needs but the "reinvention" of a method of producing synthetic rubber tires from the waste products of the kitchen to bring much closer the motorist's Utopia.

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APPERTAINING TO "STABILITY"

The "Old Man" Declines to be Interviewed on the Subject—But He Instructively Discusses It, Nevertheless.

The "Old Man"—he was old in the automobile industry but comparatively young in years—was looking over the blue prints and sketches of a new model, when there entered his office a member of his advertising department whose task it was each week or so to send out what they were pleased to call "publicity," but which in the advertising offices of newspapers are known as "hand-outs" and by various other names, some of them less complimentary. In most establishments such a caller would have knocked first, but in this particular factory everyone had the habit of strolling in to talk to the "Old Man" whenever they felt like it; he was that kind of a man.

"Well, son?" he said, looking up. "What can we do for you to-day?"

"O, I want to send out an interview with you," replied the young man, "and I thought I really ought to get an idea or two before I wrote it."

"What were you thinking of interviewing me about?"

"I was going to leave that to you, or, if you didn't care, I thought something about the stability of the industry might make a hit."

"How did you happen to be so hard up for a story this week?" said the "Old Man," as he appeared to be half-interested in his drawings.

"Hard up! Who said I was hard up?"

"Honestly now, aren't you?"

"Well, I might as well admit that I am. I couldn't for the life of me think of anything to write about. But what made you guess it?"

The "Old Man" leaned back in his swivel chair. "My boy," he said, with a half-smile, "the 'stability of the industry' is a good old stand-by of publicity writers; it's a half-brother of the 'automobiles have come to stay' story. They use it when they can't find anything else. It's a stock article, like the Japanese war scare and numerous other things. They have to be trotted out every so often. I don't blame you for trotting it out this time, but I think I know what will make a hit. Write a 'stability of the industry' interview and announce that it is the farewell trip for the old campaigner.

"Ever since the automobile industry really became established, and it has been established a long time, someone comes out every little while and remarks that it has reached the stability point. Of course, the same man doesn't use it so often, but when you think of the writers who use it, each one once in a while, it makes it rather tedious for poor old stability. There isn't any question about the automobile business being a permanent fixture in the manufacturing world, and the man who wakes up to the fact that it is stable has been slow—he is several years late.

"Of course, there was a time when there was more or less confusion and uncertainty in motor car manufacture, but the situation never was very serious. The chief trouble with the industry was that it grew so rapidly. Developments followed thick and fast. First there were 'one lungers' and two and three cylinder cars, and there was the sway back and forth between air and water cooling; then someone yelled for four cylinders, and next appeared 'sixes'; but for some time things have been going rather smoothly. The minute the automobile showed it was dependable and was useful, the industry was established. There were a few makers who went in too deep and got a little frantic, but the sound business men are still on deck and will be there for some time to come.

"But the way some people talk about 'stability' gives you the impression that about six months ago if someone had come along and given the 'industry' a kick in the shins it would have toppled over and been smashed completely. I think one thing that causes a lot of this stability talk is the changes that have been made in cars. It stands to reason that if a manufacturer can keep his plant busy with a good profit every year there must be stability somewhere. What some of these interviewers may be trying to get out of their systems is that the period of change has passed. And the period of great changes has passed—perhaps. I hesitate to commit myself, for as long as there is a world there will be changes in about everything. We have an idea that we know quite a lot more now about how to build cars than we did a few years ago, but that doesn't mean the business is more stable. We will make changes whenever we discover something better, and if we are progressive we will always be discovering something better. We all thought we had motors down pretty pat, but look at the claims being made now for the sliding valve types and the Diesel types. These are changes and developments; but they do not betoken lack of stability.

"Stability means an ability to hold your own and to be in sound financial condition, with no chance of falling off the map when something goes wrong somewhere. Automobile building is much like carriage building, only it grew faster. And would you say the carriage business is not stable? The yearly model idea is going to disappear in time, just as it does not exist to speak of in the carriage trade. When you buy a carriage you don't ask if it is a 1912 model; if it looks good and is good you take it. The series arrangement in automobile making is as much an indication of stability as anything, and some manufacturers have been building that way for years.

"What would you think of a man who insisted on getting his name in the paper over the statement that the lumber wagon business had come to stay and was stable? Wouldn't you smile just a trifle? And still there are any number of writers who keep sending out stories to the effect that the motor truck business has come to stay and is likely to become stable. But just as soon as it was demonstrated that a motor vehicle could be built which would take the place of horse-drawn trucks the industry was fixed. Of course, it is bound to grow much larger than it is now; for that matter, so is the pleasure car business. An idea that there is instability in the truck field may perhaps arise from the fact that frequently a truck or delivery wagon manufacturer goes out of business. But the trouble was with him, not with the industry as a whole. If a manufacturer starts right, ascertains the proper kind of a vehicle he should build, gets good backing for his concern, adopts right methods and knows the real value and meaning of service, there is no reason he can't succeed as a car maker or as a truck manufacturer. But the fly-by-night type, who starts slapping assembled parts together without any engineering experience whatsoever, may make a good start, but he is quite likely to fail in gaining 'stability.'

"You know as well as I do that trucks are giving good service every day, which enlarges their field and will enlarge their manufacture. Of course, changes will be made, but the idea of instability is 'bunk,' my boy, pure 'bunk.'

"I'll tell you: I'd rather you did not send out an interview making me say the automobile industry is stable. The majority of people wouldn't read it, anyway, but those who did so would surmise that it was a dull day in the publicity department. If you've got it in your system, though, and it's got to come out, just write your 'stability' story. Then when you finish it, bring it in and I'll have one of the draughtsmen put a nice 'Rest in Peace' on the overworked fellow and we'll respectfully inter him, forever."

"I never thought of it before," meekly replied the young man, as the "Old Man" paused for breath, "but now that I think of it, I have noticed quite a few of those stability interviews going around. I guess that's where I got my idea. Maybe it wouldn't be a bad scheme for me to rustle around and see if I can't get some real news—something they'll print, anyway."

Havers "Six" Enters Foreign Countries.

Tort & Co., who recently completed a steel and concrete garage in Buenos Aires, the largest in the city, has secured the agency for the Argentine Republic for the Havers "six." It is stated that the first shipment on the contract, consisting of five carloads, will leave the Havers factory before the end of June. Another foreign contract closed by the Havers Motor Co. is with the Commonwealth Motor Co., of Sydney, which has been given the Australian agency.

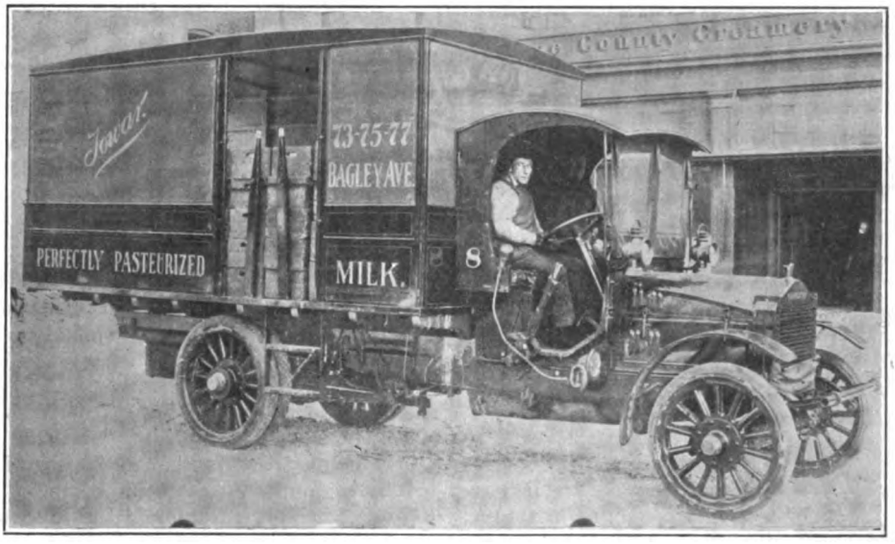
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MILK TRUCK A GLUTTON FOR WORK

Does Double Duty, Operating 21 Hours Out of 24—Service That Strikingly Illustrates Motor's Superiority.

While the superiority of motor trucks over horses covers so many points that the mere enumeration of them would make a very long list, there is one feature that stands out with particular emphasis—the capacity of the well-built machine for continuous work without the intermissions that are absolutely essential where horse haulage is adhered to.

Of course, the machine must have a certain amount of care and attention, but if it is kept in good running order—and the amount of labor required to do this is steadily growing less as trucks are improved—there is nothing to prevent almost continuous operation. An example of this is found in the case of a worm-driven Pierce-Arrow five-ton truck that is in the service of Towar's Wayne County Creamery, of Detroit, Mich. The machine not only works every day in the week, but it works 21 hours every weekday and 12 hours on Sunday—a total that would make a full two weeks' work for a truck in ordinary service, and would be entirely beyond the capacity of any one team of horses ever bred, altogether apart from the amount of material transported.



FIVE-TON PIERCE-ARROW TRUCK WHICH OPERATES 21 HOURS A DAY

Leaving the garage at 3 o'clock in the morning, the truck is loaded with five, and sometimes five and a half, tons of bottled milk and bulk milk—that is, milk in cans. This is distributed to groceries and factory dining rooms on the East side of Detroit, and by the time the load is cleared off and the "empties" all taken on it is 1 o'clock in the afternoon; the empty bottles and crates make a load of three tons, so the machine is really working all the time. Before the installation of the truck, three teams and a single wagon had about all they could do to get through this part of the work. After the truck returns to the factory and is relieved of the empties, it makes two trips to the railroad station, each time carrying five tons. On these trips the truck is in charge of the second crew, the crew that started out at 3 A. M. having done a real day's work.

After the station trips, the truck makes two trips with five-ton loads to the north end branch of the factory and returns each time with four tons of empties; the distance for the round trip is eight miles. This work is finished about 6 P. M., when the crew has lunch, after which two trips are made to the railroad station for supplies and one to the east end branch, the latter a round trip of 10 miles. After this there usually is a last trip to the station for a wind-up. By this time it is midnight, and the truck has covered a distance of from 50 to 60 miles; and in three hours it will again be at the loading platform, commencing another day's work.

The well-satisfied owner of the machine estimates that to handle the afternoon and evening work alone five heavy teams would be required; the truck, with two men, does the work steadily and surely, and with two other men the same truck does the morning's work of three teams and a single wagon. In the aggregate, the truck does the work of eight strong teams and a single wagon or two thrown in for good measure.

France's Export Trade Recovers Strength.

France's prodigious export trade, which gave evidence of going into a decline during the latter half of 1911, has regained its strength. During the first three months of the present year it advanced from $8,953,200 to $9,668,600. Great Britain still remains the largest purchaser. During the same period, imports into France fell from $664,200 to $482,800.

CAUTION SIMPLIFIES REFITTING

Multiplicity of Tools Not Chief Requirement for Readjusting Big End Bearings—How Best Done.

Taking up the wear in big end bearings is a simple enough matter when the split bushing is fitted with shims which can be removed to close up the bearing; but when the bushing is fitted up "brass to brass," as the marine and locomotive people say, it is necessary to file down the edges. While there are not as many connecting rods made in this way as there used to be, there are some, and taking up looseness is a somewhat delicate task, because it involves the removal of just so much metal and no more, and, moreover, the reduction must be made. If a greater thickness of metal is removed from one end than the other, for instance, it is obvious that the bearing will be tighter on the crankpin at the end where the greatest reduction was made. If too much is semoved form both ends, leaving a high spot in the middle, the fit of the brasses will depend upon the pulling down of the bolts, as if there are four bolts, those at one end will probably pull the brasses down close, leaving the other end slack on the pin because of the rocking effect on the high spot in the middle of the edge of the bushing. In some cases the brasses may easily be sprung out of shape by the pressure of the bolts, making an ill-fitting bearing.

An old-time method of fitting a pair of brasses is to remove them from the connecting rod, hold them firmly together in their normal position and carefully caliper the exterior near each end. If one end is a trifle larger than the other, it should be touched up lightly with a smooth file until both ends caliper exactly the same, the places where the gauging was done being marked so that the calipers can be applied at the same place each time. The crankpin must be calipered very carefully and the calipers left set. Then, before any filing is done, the interior of the bushing is calipered from top to bottom with inside calipers; at the same time, note if one end is worn any larger than the other. The difference between the two measurements will, of course, be the difference in the diameters of the pin and the inside of the bushing, or, in other words, the amount of wear that has taken place. A bit of thin sheet brass or copper having a thickness equal to the amount of wear as indicated by the two pairs of calipers that were used to measure the pin and the bearing will answer for a gauge to use in setting a pair of inside calipers so that they are smaller by the thickness of this sheet metal gauge than the outside calipers used in measuring the outside of the bushing, and then, finally, the outside calipers are set to the exact size of the inside calipers. If the edges of the

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brass are reduced until the outside calipers last set will just go over at both ends, the bushing should be a good fit on the crankpin. This process sounds somewhat complicated, but the complication is more in the telling than in the doing. Inside calipers can be used and the bushing gauged in this way as it is reduced; but it requires more skill and practice to obtain accurate results with inside calipers.

In filing down the edges of the brasses the proper tool is a flat file of the kind called "dead smooth parallel." That is, it is a very fine cut file, and the faces are perfectly flat instead of having the usual curve from end to end. The half bushing must be held in the vise very lightly, to avoid springing it, gripping it by the ends. The file is worked crosswise, bearing on both edges at once, as nearly as possible with equal weight on both, and with very light, even strokes, taking off a little all along the edges of both brasses. Fitting them together and trying with the calipers will show whether one end has not been filed more than the other. If the brasses rock upon each other the high spots must be cut down until they are fitted together flat and solid. As the final measurement is approached, the filing should be confined to the high spots, which will show up if the brasses are rubbed together with a little red lead or even oil smeared on them, and they should occasionally be tried on the crankpin to check the caliper measurement. When the job is finished and the connecting rod assembled on the crankpin, the bushing should be tight enough so that the rod, if placed in a horizontal position, will barely be held there by the friction of the bushing on the pin—or almost held. If the bushing is too tight it will have to be scraped a little to relieve it, the scraping being done at the points that show up as the highest when a little "marking" is used and the bearing moved on the pin. The pin itself is best left severely alone, unless it is in need of surfacing up—in which case an expert should do the job.

Timken Men Name a "Timken Baby."

What was styled the "Timken baby" did much to offset the serious side of the third quarterly conference of the sales staffs of the Timken Roller Bearing Co. and the Timken-Detroit Axle Co., which occurred in Detroit last week. The serious business was punctuated by a luncheon, theater party and after-theater supper, the latter of which took place in the Griswold House, and it was there that the baby appeared on the scene, or, rather, her father appeared. He is C. E. Gordon, one of the sales staff, and the Timken forces not only selected for her the name "June," but, through her father, presented her with a shower of useful articles of wearing apparel. The presentation befitted the age of the young lady. Secretary-Treasurer Lewis, of the Timken-Detroit company, served as master of ceremonies, and it was he who introduced Vice-President Demory, who in turn delivered the "speech of presentation," which "speech" Miss Gordon's father is likely to remember for several days, at least. In addition to wearing apparel, the Timken staffs also forwarded to the "Timken baby" a well filled purse. Among those who attended the conference and the subsequent ceremony were E. W. Lewis, Heman Ely, H. W. Alden, F. C. Gilbert, A. R. Demory, C. E. Gordon, P. W. Hood, E. B. Lausier, P. W. Doyle, Harry J. Porter, R. B. Weaver, C. W. Dickerson, E. A. Walton, John Hanlon, George Beadell, F. G. McClurg, W. A. Sharon, and Myron Townsend.

Grease Cups that Eliminate Evils.

Two of the evils that beset grease cups of the ordinary type—the admission of dust and the falling off of the caps—are claimed to be eliminated in a new cup that just



has been placed on the market by the Penberthy Injector Co., of Detroit, Mich., and which is shown by the accompanying illustr tion. In the new cup the cap fits over the body in the usual way, but there is a third sell, forming practically part of the body, outside of the cap, which thus fits into an annular pocket which not only excludes dust, but prevents the leakage of grease. The locking of the cap is effected by projections in the outer shell which enter grooves in the cap. While the cover cannot be jarred loose, and will retain any adjustment given to it, the detents are so designed that they permit easy movement of the cap for adjusting purposes. The cup is made in various sizes and in two types, one having a ball check so that the cup can be used in an inverted position.

No Profit in This Second-Hand Cab.

When Joseph Distler of New York City bought a second-hand taxicab from the Motor Car Exchange, 250 West 54th street, about six months ago, he evidently expected his $750 bargain would start right out and begin bringing in an ample revenue, clicked off by the taximeter, but that he was sorely disappointed is indicated in the complaint in an action he has brought in New York City Court against the concern from which he bought the car. Instead of reaping a harvest with the car, which he says was sold to him as a "Sultan Taxicab, C 727," he states he is holding the motor vehicle for the Motor Car Exchange and wants his money back. Distler's complaint is that the car was represented as in good condition, but that it proved to be otherwise, and that when he notified the sellers to take it back they refused to do so. Although he paid $250 in cash and gave promissory notes for the remainder, he alleges he has been damaged to the extent of $750 and demands judgment in that amount. The case has been placed on the short cause calendar of City Court, which should bring it to trial this week. The defense admits the sale of the cab for $750, but material admissions rest at that point.

Boston Dealers Re-elect Old Officers.

J. H. MacAlman, agent for Stearns and Columbia cars, who so long has served as president of the Boston Automobile Dealers' Association that his re-election has come to be almost a matter of course, was continued in office at the annual election of the organization, which occurred last week. All other officers were re-elected, as follows: Vice-president, J. S. Hathaway, manager White branch; treasurer, F. A. Hinchcliffe, manager Winton branch; secretary, Chester I. Campbell; directors, the president, vice-president, treasurer, and J. W. Maguire, agent for the Pierce-Arrow; A. P. Underhill, agent for the Knox; C. F. Whitney, agent for the Selden; Charles E. Fay, manager the Ford branch; E. A. Gilmore, agent for the Chalmers, and F. E. Wing, agent for the Marmon.

Jury Gives Repairers Full Verdict.

Although Andrew R. Morris claimed he was overcharged, and that his car was turned over to him in an unfinished condition by the Strathmann Automobile Co., of New York, a jury in New York City Court this week decided he must pay $695.39, the full amount of the bill with interest. Morris's contention was of the sort that frequently is heard. He claimed he turned his car over to the Strathmann company for repairs and that he was told the job would cost $250. Instead, he was presented with a bill for $783.99, on which he paid $100, leaving the Strathmann people with a claim for $683.99. Their argument was that they actually had performed the work represented in the bill and were entitled to the money, and the jury agreed with them.

Passing of a Pre-Gasolene Pioneer.

Captain Alvin C. Norcross, who built a steam carriage in 1865 and who because of the fact has been at various times credited with having invented the first practical steam automobile, died of neuralgia of the heart at his home in Revere, Mass., on Saturday last, 8th inst. He was born in Bradfield, Vt., in 1843, and early evidenced a mechanical bent which bore fruit in the form of several more or less valuable inventions pertaining to furnaces. Later, he became successively the captain of a Boston tow-boat and the yacht "Athlete," from which he derived his title. It was in the winter of 1865 that he built his steam carriage, and though he piloted it about the streets of Boston for some time, he eventually sold it, in the belief that its financial possibilities were shrouded in too much doubt. He is survived by his wife.

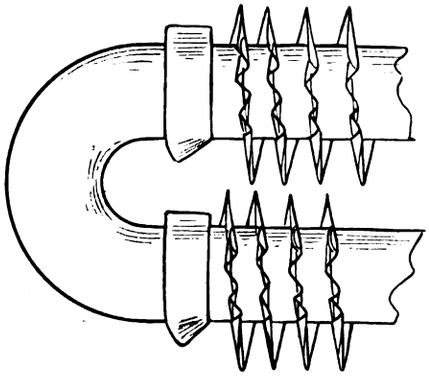
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KEEPING DOWN THE TEMPERATURE OF THE MOTOR

Why It Is Necessary to Throw Away Energy in the Form of Heat – Relative Efficiencies of Various Conductors of Heat; Convection and Radiation – Structural Details of Various Types of Water-Cooling Apparatus and Their Principles of Operation.

Smoothness of operation and extreme flexibility, which the purchaser of the modern motor vehicle is wont to demand from the power plant, as well as efficiency, are each more dependent upon the operating temperature of the motor than at first glance would seem apparent.

The efficiency of the motor, in other words, the dollars and cents involved in the operation of the power plant, is affected in three ways by the temperature; the volume, as well as the quality of the explosive mixture taken into the cylinder at each induction stroke depends upon the temperature of the apparatus, the speed of flame propagation depends upon the temperature, and the freedom of movement between the different members of the motor

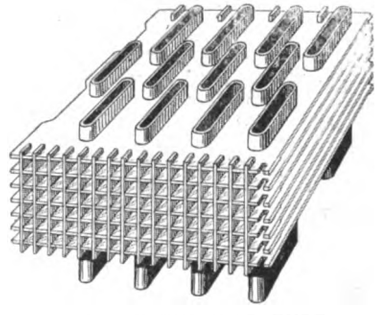


BRISCOE "SPIRAL FIN" TUBULAR

depends upon the relative expansion of the different parts which is due to the temperature changes. So, too, with the flexibility of the machine, if the temperature is too low, choking and "crankiness" are the result, while too high a temperature results in loss of power through increased friction, and irregularity of action due to preignition of the fuel.

The problem of maintaining a constant working temperature is one which has held interest for each and every designer of automobiles since their inception, with the result that although in some few instances air is used as a cooling medium and certainly is giving a good account of itself, by far the greater number of manufacturers adhere to the water cooled motor. The problem when looked at broadly simply resolves itself into the choice of cooling the hot cylinder directly with the air or of transferring the heat to another medium which can be cooled by a larger volume of air remote from the cylinders.

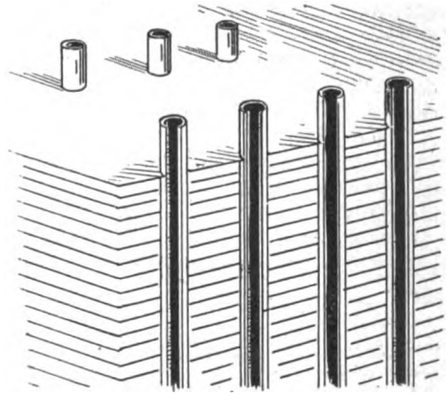
When first motor vehicles were made, cooling practice followed closely after the pattern of the system employed in stationary engine installations, and the radiator took the form of a tank positioned slightly higher than the cylinder jacket and connected therewith through the intermediary of two pipes so connected that convection currents served to transmit the heated water to the tank, and the cooler water to the jacket. The obviously poor radiating surface which was presented by the walls of the tank made the employment of large volumes of water necessary, so that very early in the development of the mod-



BRISCOE TUBULAR TYPE

ern cooling system, the weight of the cooling medium became a factor. It was not long before a simple coil of plain copper pipe was employed to partially cool the water before it entered the storage tank, the dimensions of which decreased as the surface presented for radiation by the pipe increased.

Heat is removed from the cooling water which passes through a radiator, in two forms, as radiant heat, and as conducted heat. In either form, the amount of heat removed depends upon the relative temperatures of the water and of the air which serves to take up the heat. Although the device in which the water is cooled is termed a radiator, it might better be called a cooler, for in reality very little of the total amount of heat dispelled goes off as radiant heat. Under the best of conditions, the greatest amount of heat which is dispelled in radiation from a blackened metallic surface is .6 B. T. U. an hour for each square foot of surface when the difference of temperature of the metal and the air is 1 degree. The amount of heat actually "radiated" from a radiator on a pleasure car can readily be calculated. A well designed cellular type of radiator which presents a frontal area of three square feet, presents a total radiating surface of approximately 150 square feet. The temperature of the cooling water as it enters the radiator should be, in a well designed motor, in the neighborhood of 175 degrees. Taking the average temperature of the air as 75 degrees, the difference of temperature will be 100 degrees and the amount of heat radiated in one hour then will be .6x150x100, or 9,000 B. T. U. In designing the cooling system of a motor car, it is customary to allow for the dissipation of 125 B. T. U.s a minute for each brake horsepower developed at the rear axle. If 40 horse power can be taken from the rear axle, a cooling system so designed relieves the cylinders of the motor of 40x125, or 5,000 B. T. U.s a min-



McCORD TUBULAR RADIATOR

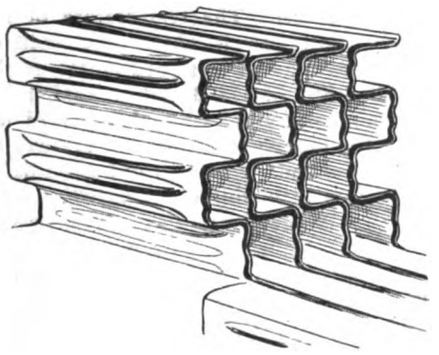
ute, or 300,000 an hour, and but 9,000 B. T. U.s go off as radiant heat—just 3 per cent.

Since air is a very poor conductor of heat, and the amount of heat which leaves a radiator as radiant energy is so slight, the necessity of a thorough circulation of the air through the radiator so that, in so far as is possible, every particle of air will come in contact with the cooling surface of the radiator at once is apparent. Really, the problem becomes not so much a problem of cooling the water as it is one of heating the air. One pound of air will absorb but 23 per cent. of the quantity of heat which an equal weight of water will for a given temperature change, or, in other words, the specific heat of air is but 23 per cent. of the specific heat of water. One pound of water, then, is equivalent to 4.34 pounds of air as a cooling medium, which means that for every pound of water which is passed into the radiator which is operating under the best of conditions as to both water and air circulation and difference of tempera-

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ture, 4.34 pounds of air must come in contact with the cooling tubes. Approximately 13 cubic feet of air are necessary to weigh a pound, so that for every pound of water which passes through the radiator, provided the change in temperature of both substances is alike, at least 56 cubic feet of air must be circulated.

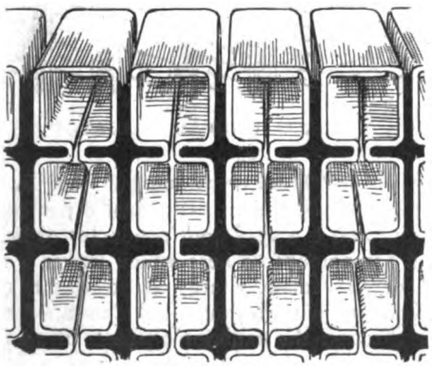
The amount of heat absorbed by a body depends upon the weight or mass of the body and the change of temperature, as well as its specific heat. Thus, if 100 B.



"CRINKLED PLATE" LIVINGSTON

T. U.s are to be absorbed by water, the specific heat of which is 1, the quantity of water is immaterial, provided the temperature can rise through a suitable range. One pound of water will absorb 100 B. T. U.s if its temperature is raised through 100 degrees, while 100 pounds of water will absorb the same quantity of heat, with a temperature change of but 1 degree.

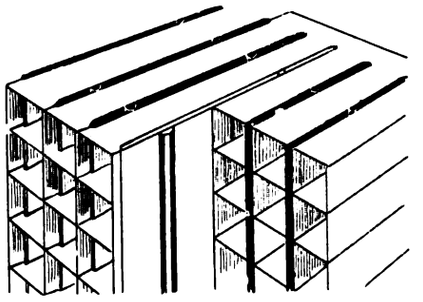
For various and sundry reasons, it is well to cool a motor with large quantities of water, the temperature changes of which



BRISCOE CELLULAR CONSTRUCTION

are slight, and this is especially true where pump circulation of the cooling medium is employed and the rapidity of circulation is independent of the difference of temperature of the water at the top and in the lower sections of the cooling system. Not the least important of these reasons is that when the temperature of the cooling water is more nearly uniform throughout the system, the cylinders of the motor are not subject to severe stresses and strains, due to unequal expansion, induced by wide difference in the temperatures of the water entering the jackets at the lowest point and the water leaving at the top. Then, too, if the motor is operating under the best conditions as to temperature, that is, if the maximum temperature of the water in the cooling system is in the neighborhood of 175 degrees, it is evident that if large quantities of water pass through the cooler and the temperature is lowered but slightly, the average temperature of the surface of the radiator is quite near the maximum temperature of the cooling medium. Not only does this uniformity of temperature prevent unequal expansion in the more or less vulnerable device, but it also renders every square inch of frontal area of the cooler as effective in passing off heat units to the air as the next one; for, as has been stated, heat conduction depends upon the difference in temperature between the air and the water. If the total surface of the radiator can be kept at a temperature more nearly that of the water as it leaves the jacket, it is obvious that the air which passes through the lower passages of the radiator will carry off as many heat units as will the air which passes through the higher strata.

As automobile design and construction progressed beyond that stage where all

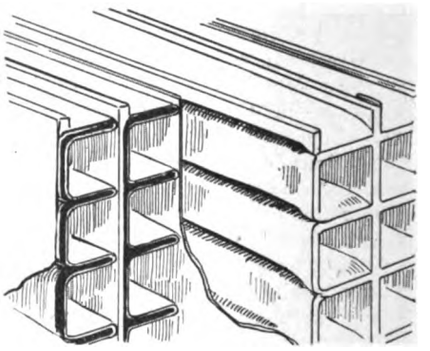


KENWOOD FLATTENED TUBES

of the stops save the one at the end of the journey were involuntary on the part of the operator, the necessity for more efficient water cooling devices which would permit of the indefinite operation of the machine without the chance of overheating the motor, became apparent, and the simple coil which was provided in the earlier machines was made more efficient by the addition not only of more coils, but also of rows of copper disks which served to expose more radiating surface to the air. The disks, which were made of copper, sometimes were perfectly flat, and in other designs were corrugated to provide more surface, and were sweated on to the ⅜-inch copper pipe which served to conduct the water. A tank of relatively small capacity generally was provided, but since the motor was not expected to be operated for any length of time, when the car was inoperative, fans were not provided save in very rare instances.

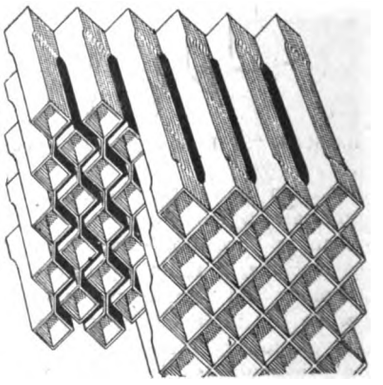
Such a good account of itself did this type of radiator render that the design has persisted to the present time, but the application is limited almost wholly to commercial vehicles, and its use there is chiefly due to the low cost of manufacture, and the facility with which it can be repaired and a general "ruggedness" which is an inherent characteristic of the type. One of the accompanying illustrations shows a portion of a modern radiator of this type, as made by the Briscoe Mfg. Co., of Detroit, in which the disks are supplanted by a corrugated ribbon spirally wound around the tubing.

While the tubular radiator provided with radial fins was and is perfectly capable of taking care of the wasted jacket heat from



CELLULAR TYPE McCORD

motors of small power without occupying too much space and adding weight which is incompatible with high efficiency, the relatively small amount of water which can be forced through the single pipe with its numerous "U" turns renders its use with the higher powered and multi-cylinder motors quite out of the question. Less surface also is exposed for contact with the water with a pipe of circular cross section than if the section were of any other



BRISCOE HONEYCOMB TYPE

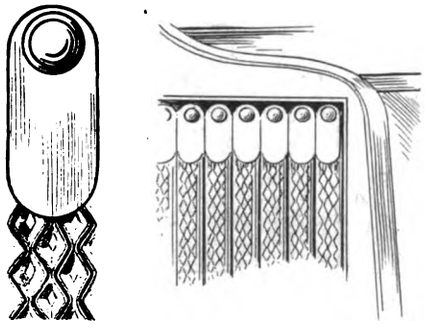
figure, and this in itself renders the type comparatively inefficient. Improvements have been made on two different lines. Instead of making it necessary for the pump to force the water through the entire length of a single coil of pipe, several sections of pipe, each provided with the radial fins, are connected in "multiple" with the inlet and outlet pipes, so that the quantity of water which can be passed through the radiator has been greatly increased. In many designs the surface of contact with the water was increased by the adoption of pipes of cross sections which were other than cir-

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cular. Like the continuous single tube radiator, this type, for some time practically was standard, and up to the present time the chief reasons for its limited application are the slightly greater efficiency and decreased weight of some of the later types of vertical tube and cellular type radiators, as well as their neater appearance.

The vertical tube type of cooler, which has won so much favor among the producers of the low and medium priced machines, consists essentially of an upper and a lower tank or "header" which are joined with a series of vertical tubes, so arranged in combination with a series of plates that an efficient radiating surface is produced. The shape, size, location and number of tubes vary very widely in the products of the different manufacturers, and scarcely any two are so similar with regard to the plate equipment as to be considered as being in the same general class.

The vertical tube type, as exemplified by the product of the McCord Mfg. Co., of Detroit, is simple in the extreme, and if the number of well known motor cars on which



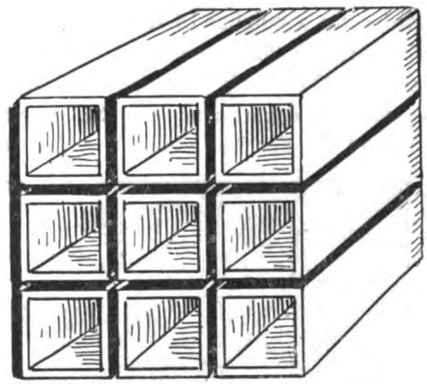
BEHRINGER "SECTIONAL" CELLULAR

McCord radiators appear can be taken as a criterion the efficiency of the product cannot be doubted. As shown in the illustration, numerous circular tubes provide ample passage for the water from the upper to the lower header, cooling surface being provided by a series of plates which lie in a horizontal plane and contact with each of the tubes, the joints being sweated. The perfectly even spacing of the cooling plates gives the finished product that neat appearance which is so much desired.

Briscoe practice embraces the use of perfectly flat and evenly spaced cooling plates also, but the tubes are flattened so as to provide ample contact with the water, and are "staggered," forming three rows from the front to the back of the radiator. Considerable rigidity is procured, as well as an appearance not unlike that of a cellular type of radiator by the addition of a series of narrow metal strips which are "mortised" into the cooling plates, and reach from top to bottom of the radiator.

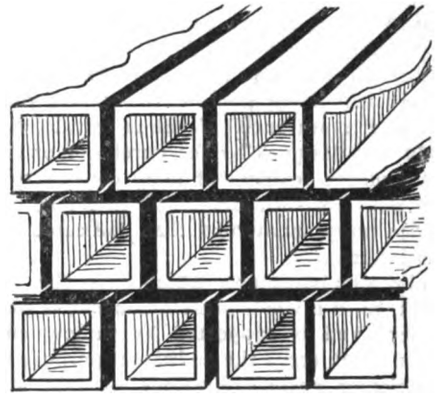
Kinwood radiators, which are made in Toledo, Ohio, by the Kinsey Manufacturing Co., are novel in that the tubes which are very much flattened, so much so that but one row is employed, are formed from sheet metal seamed at the front. The joint tapers and is continued to the front of the radiator, so that resistance to the air is considerably reduced. The flat cooling plates are sweated to the tubes and are so spaced with regard to the spacing of the tubes that the radiator has a cellular appearance.

Harrison tubular radiators, which are made by the Harrison Radiator Co., Lockport, N. Y., embrace the use of "fluted" tubes built from single sheets of metal and



FEDDERS SQUARE TUBE TYPE

extending in a single row from front to back. Not only do the corrugations add considerable to the radiating surface, but they stiffen the radiator, although ample provision is made to secure rigidity by the addition of distance pieces. The perforated plates which contact with the tubes and provide additional radiating surface, are so shaped that when the radiator is assembled the air passages are hexagonal, giving the



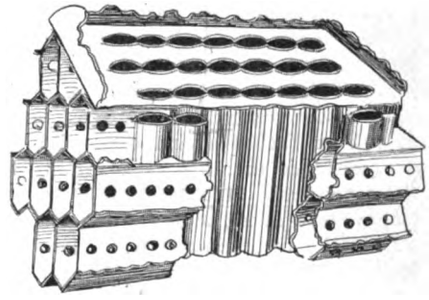
FEDDERS STAGGARD TUBES

radiator a "honeycomb" appearance. The perforations prevent the formation of air pockets, which considerably lessen the flow of air through the passages.

The efficiency of the cellular type of cooler depends upon the fact that large areas are provided for contact with both water and air, while the free passage of either medium through the proper passages is but very slightly hampered by the size and the shape of the respective passages. Practically the entire surface which is in contact with the water is separated from the surface in contact with the air only by the thickness of the metal from which the radiator is constructed; in other words, the surface exposed to the water practically is equal to the surface exposed for radiation. As is the case with the vertical tube type, a great many different designs are produced.

The radiator produced by the Livingston Radiator and Manufacturing Co., of New York City, is a good example of the cellular type. As the picture shows, it is built up of a series of tubes formed by the joining of two corrugated plates, the edges of which are "swaged" and soldered. The corrugations not only insure rigidity, but restrict the passage of the water just sufficient to insure the equal flow of water in all of the tubes all of the time, and furthermore, they increase the radiating surface. The swaged edges of the plates cause the air passages to taper toward the front and rear, which permits of the free entrance of the air.

Briscoe practice with regard to the cellular type of radiator embraces the use of a single plate which is doubled over in the middle and rolled so as to form air pas-



HARRISON "FLUTED" TUBES

sages of square cross section. Several series of these plates soldered together at the edges enter into the formation of the radiator, the water passages being formed between the air passages, so that the latter are completely surrounded by water, as shown in the sketch. With the Briscoe honeycomb type, the air passages are formed in a similar fashion, the edges of the plates being "flared" and soldered. This type, however, instead of being mounted in the radiator frame so that the bases of the square air passages are horizontal, are mounted with one of the diagonals in the horizontal plane.

The McCord cellular type also is built up of sheets which are soldered together at the edges, but in the McCord radiator every alternate sheet is perfectly flat. The formation of the square cross-sectioned air passages is accomplished by proper bending of one only of each pair of sheets, the edges of which also are flared and soldered.

Fedders square tube radiators, which are the product of the Fedders Mfg. Works, of Buffalo, N. Y., are built up in two styles. The water passages, which are clearly shown in the illustrations, are formed by flaring the tubes at both ends before they are soldered. The radiators are made with

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the tubes "staggered" one over the other, or with one placed directly over the other, forming straight rows.

General radiating efficiency, coupled with special facility with which repairs can be made, have been the chief aims of the designers of the Behringer radiator, which is made in Ticonderoga, N. Y., by the Behringer Radiator Works. The tubes, which are formed of corrugated plates, are mounted together "crest to crest" in groups of four, each group forming a separate unit which can be removed from the radiator in case of rupture and replaced by a similar unit. Each unit is provided with a casting at the upper and the lower end, as shown in the sketch, which serves for attachment to the headers. In case of a broken tube, when another unit is not at hand, suitable plugs can be inserted in the header openings after the removal of the ruptured unit, and the journey continued.

Mayo practice with regard to the cellular type of radiator embraces two separate and distinct designs,; square copper tubing, however, enters into the construction of each. In one design, which might be termed a cross between a cellular and a vertical tube type, the tubes are flared on the vertical sides of the ends only and are set one upon the other, the ends being soldered. The result is the formation of a single row of elongated water passages which taper toward the ends and thus offer but slight resistance to the passage of the air. In the other design, the tubes are staggered one above the other, and the construction results in the formation of water passages which entirely surround the tubes through which the air passes and which are tortuous enough to retard the flow of water for a sufficient length of time to insure proper cooling.

From a simple water container, so placed that the air currents induced by the motion of the vehicle would partially cool the contents, the water cooler has progressed step by step through many intermediate stages, until at the present stage radiator efficiency and durability are such that far-reaching improvement seems almost impossible. If motors of the future should operate on such a cycle that preignition can be prevented by means other than excessive cooling, radiators will be designed to take care of the wasted jacket heat of the motors operating under normal and not abnormal conditions, as at present. With such practice in vogue, which will mean the reduction of radiating surfaces, it is not at all unlikely that increased radiator efficiency will be found unnecessary.

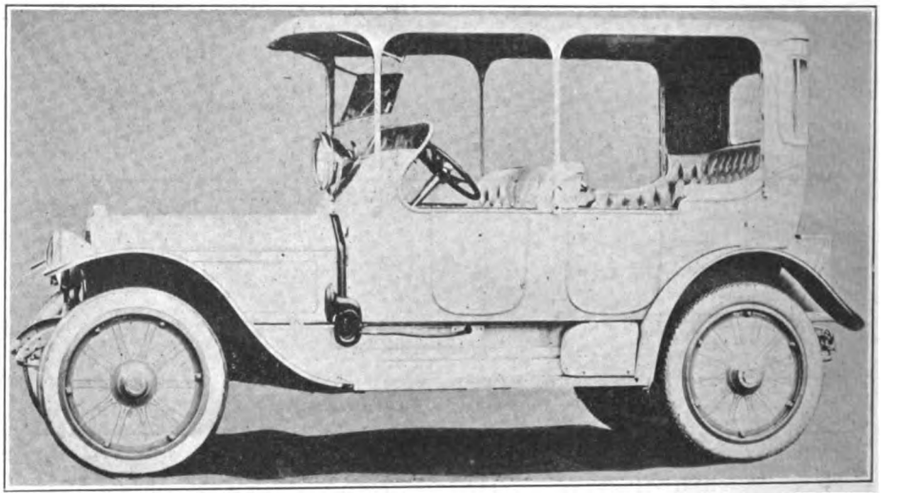
How Dirt May Enter Carburetter.

Dirt in the carburetter which cannot be accounted for in any other way may get through the small hole that sometimes is drilled in the float chamber cover. Covering the hole with the finest wire gauze will keep out particles of grit large enough to make themselves felt.

CAR BRISTLES WITH ECCENTRICITY

Peerless Model Constructed According to Owner's Ideas—Looks Like Windowless Limousine but Isn't.

Indicating in a measure just what the word "service" may signify, and also the flights of fancy with which service departments have to wrestle, the accompanying picture shows a "38-six" Peerless car which incorporates a number of features that are sufficiently out of the ordinary to attract attention. The body was constructed by the service department of the Boston branch of the Peerless Motor Car Co., and there is little reason to dispute the claim to the effect that it is the first of its particular kind, though there have been other bodies which approach it in general outline and appearance. Needless to add, the body was designed by the purchaser of the car, and the features of body construction doubtless have advantages which are, to the owner, more numerous than indicated by the picture.



PEERLESS CHASSIS MOUNTING OWNER'S IDEA OF COMFORTABLE BODY

The superstructure, which give the appearance of a windowless limousine, is permanent and is supported by hollow columns which serve the additional purpose of conducting away collections of rain and thus preventing them from dripping on occupants of the car. The body is formed of aluminum and is equipped with an exceptionally high dash, the top of which consists of a celluloid panel six inches in height. Supplementing the usual complement of lamps, a searchlight is mounted in a slight concavity in the dash and is interconnected with the steering mechanism, so that a beam of light always illuminates the path of the car. The windshield is supported from the roof of the car and is arranged so that when not in use it may be folded up out of the way against the roof panels. Another of the unusual features of the car is that the wheel spokes are fully enclosed by means of metal disks, the object being to prevent accumulations of mud and dirt insofar as is possible. In order to preserve the appearance of the wheels, however, the services of an artist were requisitioned and the spokes painted on the disks, so that at a casual glance the disks may not be discerned. The chassis of the car is a stock creation throughout.

Mammoth Gas Engine for Ford Plant.

By way of still further increasing its facilities, the Ford Motor Co. shortly will install a mammoth producer-gas engine in its Detroit plant. The engine, which now is under construction at the works of the Hoover, Owen, Rentschler Co., is rated at 5,500 horsepower and will be of the twin tandem double-acting type, the four cylinders measuring 42 and 72 inches bore and stroke, respectively. The piston rods measure 30 feet in length by 13 inches in diameter and are hollow, cooling water being pumped through a 7½-inch longitudinal passage. They are made of vanadium steel with an elastic limit of more than 100,000 pounds.

Grinding and the Effects Obtained.

To those who are of thoughtful disposition, wonder at the elaborate precautions taken by manufacturers to finish parts with such care often has manifested itself in the question, "Why is grinding necessary?" The answer is perfectly simple to those who have done lathe work or who have had opportunity to see some one else do it. Due to the "give" in the tool, and to the "feed," a certain amount of irregularity is apparent in every piece of metal that is turned. The same holds good in boring operations. There is only one method of of economically and efficiently removing such tool marks, and it is by grinding. Unless they are removed, friction and excessive wear result as a matter of course, which, in brief, explains the necessity for at least one of the manifold and expensive operations of manufacture.

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GETTING RID OF THE EXHAUST

Expert Outlines Some of the Problems Involved and Explains Their Solution —Interference that Effects Efficiency.

Owing to the nature of the exhaust products of internal combustion engines, the gases are condensable to a very limited extent, which is dependent entirely upon the amount of moisture which they contain. In any case the reduction in volume which such slight condensation as may take place effects practically is negligible and scarcely can be compared with the almost complete condensation which takes place in a steam engine, for instance. Of course, there is a great difference in the problem involved in efficiently ridding steam engine cylinders of the steam that has performed its work and in ridding gas or gasolene engine cylinders of the gases which have become useless, and this is one of the principal points which Professor Frederick Hutton, who is the chairman of the Technical Committee of the Automobile Club of America, brought out in a lecture which he delivered before the club. The lecture was entitled "Some Problems of the Exhaust," and after reviewing briefly the objects which designers seek in solving such more or less intricate problems, Professor Hutton said in part:

"The condensation of steam so reduces its volume in cooling its temperature that even an inadequate system of condensation can eliminate almost entirely any exhaust problem whatever. The best steam cars lower the pressure of the exhaust as it leaves the cylinders by working it in a second or intermediate cylinder; and afterward the cooled steam is changed to water and pumped back into the boiler. The same procedure of reducing temperature and diminishing volume by such cooling is sought in the internal combustion motor, but the fact that there is no condensation makes the problem much more difficult. The problems to be considered in the discussion will be limited to two, viz., (1) the prevention of back pressure on the working pistons, and (2) the prevention of noise from the escape of high pressure gas.

"To review briefly the action which takes place in the internal combusion engine the ordinary four cylinder piston motor should be examined. The events which succeed each other in each cylinder are:

"(1)—The aspiration of fuel and air from the carburetter.

"(2)—The compression of this mixture to about one-third of its original volume, or in the neighborhood of about 40 pounds above atmosphere.

"(3)—The firing by the passage of a spark in this mixture so that the fuel ignites, heats the air and increases the pressure in that diminished volume.

"(4)—The expansion of this mixture with diminishing pressure as its volume increases.

"(5)—The opening of the exhaust valve and the expansion and displacement of the products of combustion out into the exhaust pipe to the muffler and to the open air.

"It will be apparent if there are four cylinders that these events can be made to

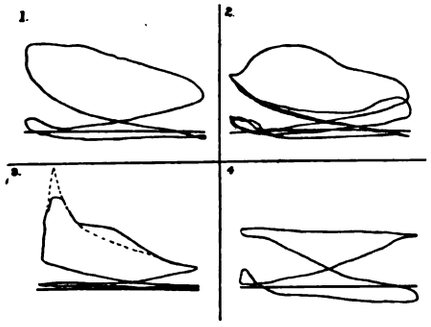
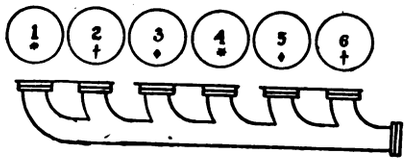
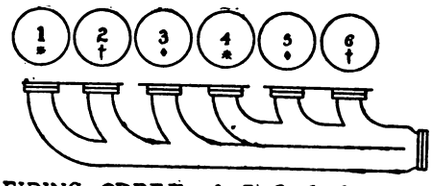


FIG. 1—TYPICAL ENGINE DIAGRAMS

take place in succession so that no two cylinders shall be exhausting at the same time. The ordinary succession for conveniencing in balancing the pistons is to have the succession of events 1, 3, 4 and 2, with No. 1 cylinder nearest to the front. The thing that can happen, however, is that if the exhaust pipe has not carried





FIRING ORDER -1-5-3-6-2-4
††* INDICATES TWO CYLINDERS THAT ARE EXHAUSTING AT THE SAME TIME

FIGS. 2 (UPPER) AND 3 (LOWER)

away the exhaust gases that gas pressure may tend to pass from such exhaust pipe into the cylinder if the pressure in such exhaust pipe is higher than in the cylinder when the exhaust valve opens.

"By increasing the number of cylinders above four, the danger of stalling the engine at low speeds is diminished; power is increased by increasing the piston area without increase of cylinder diameter; and a more uniform turning movement, a continuous carburetter flow and a greater flexibility is introduced for a wide range of speeds so as to approach the ideal set by the double-acting cylinders of the steam motor.

"If the number of cylinders becomes six the cranks should be conveniently set at angles of 120 degrees from each other. Hence, the cranks will be at such angles that, viewed from the end of the crank shaft they appear to be at zero, 120, 240 and 360. The latter is the same as zero and the angular relation repeats itself for the second set of three cylinders. The ordinary order of firing will be counting from the front as before, 1, 5, 3, 6, 2, 4. This must necessarily, therefore, mean that cylinders 1 and 4 exhaust partly together; 2 and 6 exhaust together; 3 and 5 exhaust together. As in the four cylinder engine, the piston and connecting rod weights are in balance on opposite sides of the crank axis; and as a rule the two cylinders doing the same thing will be on opposite sides of a center bearing if there is one for the crank shaft; or on opposite sides of a line of symmetry between cylinders 3 and 4 if there is no center bearing."

By the way of making plain this rather complicated action, Professor Hutton had constructed an ingenious model, which was so arranged in a stereopticon that a silhouette picture in black and white was projected on the screen and the overlapping of the exhaust periods became clearly visible. In demonstrating that in actual practice the pressures in the exhaust manifold interfere with the action of the engine to a greater or lesser extent, a reflecting indicator or manograph was used. The accompanying diagrams, which were taken from engines, were used in making this point plain, Professor Hutton's explanation being as follows:

"In Fig. 1, No. 3, for example, is a normal high speed diagram. The full lines are the actual tracings of the spot of light on a photographic film. The dotted lines are theoretical in the sense that they are intended to show what the diagram ought to have been had it been perfect. Due to slow propagation of the flame, the pressure did not reach the point which it ought to have done ,as shown in the dotted lines in the upper left hand corner. An excessive spark retard or a poor mixture produces a late burning and raises the pressure in the middle of the stroke. The gases, however, were excessively hot when the exhaust opened, and such a condition would boil the radiator water, pit the exhaust valves, and cause other trouble.

"In Nos. 1 and 4 the diaphragm of the manograph was prevented from full motion at the top in order to exaggerate the phenomena at the bottom of the diagram by the use of a weaker spring than could have been used if full motion had been permitted to it. These both show at the left hand lower corner a rise in pressures which does not occur in the top diagram of No. 3. These are the flow-back of exhaust gases from another cylinder into the valve chamber of the cylinder which was being observed. No. 4, which is a freak so far as the top is concerned, due to suppression of the free motion of the diaphragm, makes the bump due to this back flow obvious.

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"Figures 2 and 3 show the condition in a six-cylinder engine such as the one illustrated in the model when no particular attention has been paid to design the manifold (Fig. 2), and when the manifold has been carefully designed (Fig. 3). The difference is that the exhaust gases from cylinders 1, 2 and 3, in Fig. 3, do not meet the discharge from cylinders 4, 5 and 6 until they are moving together at a considerable velocity at the extreme right end of the diagram. Here there can be no back pressure surging into the cylinders from changing conditions in the manifold. From the notation it will be apparent that by dividing the cylinders into sets of three all interference between the exhausts has been eliminated."

Overland Band to Sweep Country.

As a sort of reward of merit for faithful service, John N. Willys, president of the Willys-Overland Co., Toledo, O., has arranged a vacation for the 50 musicians in the Overland band that should leave little but joy in their hearts. Yesterday (Wednesday) the entire band started on a month's trip, which will take them through practically all of the Western states, with stops in 24 of the principal cities en route, where concerts will be given in the public parks, under the direction of Herr Gustav Koehler, who swings the baton. Included in the itinerary are stops in St. Louis, Memphis, New Orleans, Galveston, Houston, Dallas, El Paso, Tucson, Los Angeles, Sacramento, San Francisco, Portland, Salt Lake City, Cheyenne, Rawlins, Kansas City, Des Moines, Colorado Springs, Denver, Minneapolis, Milwaukee, and Chicago. The band, which has been in existence for some 18 months since its formation, under the direction of Willys, is composed of boys and men from among the 7,000 employes in the various departments of the company. In addition to paying the musicians their regular salaries while en tour, Willys will foot all the bills incidental to special trains, the best hotels and the fat of the land generally.

American Car First Across Australia.

For the first time the Australian continent has been crossed by an automobile, an American car—a 10 horsepower Brush runabout—accomplishing the feat. It was driven by Francis Birtles, who covered the 2,600 miles between Perth and Sydney in 28 days and 2 hours. Several previous efforts have been made, all of which proved unsuccessful, and the journey was regarded as practically impossible. Birtles, however, previously had made a number of transcontinental trips on a bicycle, and the knowledge he gained on these trips aided him greatly, for it was necessary to motor through 1,000 miles of uninhabited country and 200 miles of sand hills. Birtles's outfit included a bicycle, dog, tent, sand mats, shovels, guns and moving picture machines, in addition to the usual provision for food and water.

ROAD THAT WAS BUILT FOR A TOUR

Public-Spirited Residents of Northern Arizona Create a "Short Cut"—70 Miles Over Desert Country.

To build, for especial use of an automobile tour, a stretch of road over seventy miles in length, traversing a country that heretofore has been accessible only to pack animals is the unique feat of a body of public-spirited residents of northern Arizona.

The new road connects the railroad at Ash Fork with the government reservation at Grand Canyon. The tour for which it was constructed is the first of its kind, including as it does, an aggregation of over sixty Studebaker cars, nearly all of which are owned in Phoenix, the Arizona metropolis. It is being promoted by the Studebaker agent and will have enough of the competitive spirit in it to justify an award of prizes, chief of which will be the "Governor's Cup."

When the tour was first announced, it was the intent of the Phoenix men to drive their cars to the Canyon by a rough roundabout route, following the lines of the Santa Fe Railroad by way of Williams. But the citizens of Ash Fork objected. They appreciated the fact that their own town was missing a fine chance to show itself to advantage, on the map. A committee accordingly told the Phoenix people that they would guarantee a more direct route, via Ash Fork. Then they went to work with their picks and shovels, working out half-way, where they met a similarly public-spirited gang of road-builders from Grand Canyon, who had laid out the second half of the trail. The whole job was under the direction of the veteran "Bill' Bass, who antedates railroad building in that region and has been locally credited on many occasions with having dug the Grand Canyon himself. This feat Bass modestly denies, however.

The Studebaker Flanders "20" pathfinder for the tour recently made the trip to the Canyon over the new road. Though the car carried five men and their baggage, the run was easily made at an average speed of nearly 20 miles an hour.

The entire distance over the new road logged slightly more than 73 miles. About half was typical desert country, inhabited by prairie dogs, coyotes, a few antelope and an immense herd of wild horses. The other half is similarly arid, but rather mountainous. For more than 25 miles the road follows a tortuous valley. There is no human habitation between Ash Fork and Grand Canyon, and not a single well or stream of water, except in the rainy season, now several months past. Had an accident of any crippling kind taken place, the crew of the car would have been forced to walk to civilization. No such event occurred, however, the tourists arriving in a state of mind that enabled them to fully appreciate the majestic beauty of the great cleft through which the Corolaro rushes on its way to the sea.

The new automobile route which the Studebaker tour is establishing will appeal strongly to eastern motorists in search of a new touring field. Ash Fork citizens look forward to a steady stream of travel, setting in as soon as the advantages of the trip become generally known and its delights are advertised.

Westgard to Cross Continent Thrice.

Thrice to cross the continent in a Pathfinder car, and on each crossing to map out a different transcontinental trail, is the work cut out for A. L. Westgard, who started, Tuesday morning last, 11th inst., from the headquarters of the A. A. A. on the first leg of the journey. And no man is better fitted for the work. He already has made three automobile trips between the Atlantic and the Pacific. The purpose of his present expedition as set forth by the A. A. A. is to survey, map out and standardize three easily followed routes styled the "Northwest Trail," the "Overland Trail" and the southern or "Midland Trail." The initial journey will be made over the Northwest route, which will carry Westgard through Albany, Buffalo, Cleveland, and Chicago to Minneapolis, whence the path leads through the states of North Dakota, Montana and Washington to Seattle. The pathfinder will then make his way to San Francisco and start back over the Overland route, which will take him through Salt Lake City, Denver and Omaha to Chicago; thence to Buffalo and through Rochester, Canandaigua, Elmira and Binghamton to New York. The third route will lead from New York through Philadelphia to Hagerstown, thence along the old National Highway through Iowa, Ohio, Indiana, Missouri and Central Kansas to Colorado Springs, across the Rockies via Salt Lake City and through Nevada to Los Angeles.

Used Muffler as Joke Killer.

Whether jokes in Kansas City, Mo., are unusually stale or whether the inhabitants insist on reviving sections of that famed humorous history of a journey on a slow train through the confines of a neighboring state, is not inferred from a story emanating from the above mentioned city, but which story indicates that this breezy western town is not always up-to-date in the joke line. A muffler cut-out and a motorcycle "cop" are responsible for the story's coming to light.

The "cop" had instructions to arrest offenders of the cut-out ordinance, and when he brought one woman driver into court she said: "We had our muffler cut out just for a joke. One of my friends was telling stores, and when he came to recite a stale incident, the muffler was opened for no other purpose than just to discomfit him. We did not intentionally violate the law."

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1,008,355. Clutch. George W. Morris, Racine, Wis. Filed Dec. 10, 1909. Serial No. 532,299.

1. A clutch of the character described comprising a male member provided with a rim, a friction shoe for engagement with said rim, a female member and means carried by the female member for actuating said shoe comprising a short shaft passing through the female member, links pivotally connecting said shoe to one end of said short shaft at diametrically opposite sides of said shaft, a crank arm mounted upon the opposite end of said short shaft, said crank arm being provided with a part extending outward toward the periphery of the female clutch member and a toggle lever pivotally connected at its outer end to said part that projects outward from said crank arm and a sliding sleeve pivotally connected to the opposite end of said toggle lever.

1,008,430. Tire Tool. Charles Owen, William Walter Heckethorn and Shadrach William Cole, Lemar, Colo. Filed Feb. 25, 1911. Serial No. 610,907.

1. A tire tool, consisting of a handle having a V-shaped notch formed adjacent one end thereof, and a notched nose extending from the V-shaped notch and terminating in a bearing point and having a recess formed between the bearing point and the side thereof, and an arm pivoted to the said handle, substantially as and for the purposes set forth.

1,008,517. Wheel. George Marcellus Badger and George T. Badger, Quitman, Ga. Filed Mar. 29, 1909. Serial No. 468,447.

1. The herein described improvement in wheels comprising a wheel body having a rim, a rim tread surrounding the rim and spaced apart therefrom, a three point suspension hinge having inflexible leaves pivoted together at one end, the other ends of the respective leaves being pivotally attached to the inner side of the rim tread and to the other side of the wheel body rim, a rigid extension secured at the pivotal connection of the leaves, said extension being rigid relatively to one leaf of the spring, and springs located respectively between the extension and the rim tread on one side and the wheel body rim on the other.

1,008,643. Anti-Friction Bearing. Henry Hess, Wawa, Pa., assignor to the Hess-Bright Manufacturing Company, Philadelphia, Pa., a Corporation of Delaware. Filed Feb. 13, 1909. Serial No. 477,743.

1. An anti-friction bearing comprising two radial bearings and a thrust bearing located between them, one of the casing members of each of the radial bearings forming a part of one of the elements of the thrust bearing, and the other casing members of the radial bearings being disconnected and relatively movable.

1,008,649. Headlight Operating Mechanism. Henry Kiehlbauch, Tripp, S. D. Filed Apr. 29, 1911. Serial No. 624,160.

1. In a motor vehicle, the combination with the steering mechanism, of a rod operated by said mechanism and provided with an angled end, a core piston swiveled to the angled end, a sleeve having slots through which the angled end transversely extends, so as to move longitudinally within the slots, the piston being slidably mounted in the sleeve, yielding means on each side of the piston and acting against the closed ends of the sleeve, headlights, and a connection between one of the headlights and the sleeve.

1,008,666. Top Attachment for Automobiles. John C. Munday, Dayton, Ohio. Filed June 4, 1910. Serial No. 564,966.

The combination with an automobile body having front and rear seats and a permanent foldable canopy top over the front seat, of a flexible rear canopy top having a frame detachably connected to the rear portion of said body and carried forward and detachably connected to the rear end of said front canopy top, and flexible connections extended from the joint formed between the two conopy tops to a suitable part of the body, substantially as specified.

1,008,679. John E. Strietelmeier, Cincinnati, Ohio, assignor to the Ideal Wheel Company, Cincinnati, Ohio, a Corporation of Ohio. Filed Feb. 23, 1911. Serial No. 610,248.

1. A wheel comprising a rim, a hub, a series of bowed spring spokes extending radially from said hub to said rim and bulging from each other at their central part and bulging in the reverse direction near each end, outwardly extending lugs on said hub and inwardly extending lugs on said rim each having curved surfaces adapted to receive the curved end surfaces of the spring spokes respectively, and bolts extending transversely through said lugs and spring spokes respectively, nuts adapted to secure and clamp said spring spokes in position, and a series of intermediate curved springs secured at their ends to said bowed spring spokes between their ends, and another series of curved spring spokes secured to the spring spokes at this end adjacent to the hub and also near the center of the convex sides of said spring spokes, substantially as set forth and for the purposes specified.

1,008,713. Vehicle. James E. Grace, Detroit, Mich., assignor, by mesne assignments, to Chief Automobile Company, a Corporation of Michigan. Filed Nov. 4, 1910. Serial No. 590,634.

The combination of a chassis frame having side members provided with openings, a body detachably supported by the frame, members on the body engaging the frame openings and interlocked therewith by a longitudinal movement of the body upon the frame, hooks secured to the forward end of the body, a dash board and side rails secured to the frame, interlocking spring members secured within recesses in the side rails to engage the hooks and prevent the longitudinal movement of the body upon the frame, and means carried by the chassis frame for operating the spring members.

1,008,805. Door for Automobiles and Other Vehicles. Fred England, Amesbury, Mass., assignor to Amesbury Metal Body Company, Amesbury, Mass., a Corporation of Massachusetts. Filed Apr. 25, 1911. Serial No. 623,310.

1. A metallic panel for vehicle bodies, having an edge fashioned with a flange disposed at an angle to the surface of the body of the panel, a projecting portion outside the said flange and the body of the panel, and a molding integral with the metal adjacent the said projecting portion.

1,008,945. Friction Clutch. John C. Brewin, Philadelphia, Pa. Filed Dec. 14, 1910. Serial No. 597,383.

1. In a friction clutch, and in combination with a driving element, a driven element, an expansion member sustained by one of said elements, means for moving one end of said member circumferentially, and a movable device engaged by the other end of said member, said movable device also engaging the expansion member between its ends to apply outward pressure thereto.

1,008,962. Dirigible Lamp for Automobiles. Joe Drzewiecki, Detroit, Mich. Filed Aug. 9, 1911. Serial No. 643,175.

In a dirigible lamp for automobiles, the combination with the knuckles of a forward axle of the automobile, and vertical shafts supported by the automobile and provided with lamp holders, of arms carried by said knuckles, a connecting rod pivotally connected to said arms, upwardly extending pins carried by said connecting rod, a shifting bar, inverted cups carried by said bar and receiving said pins, compression springs encircling said pins within said cups, angle extensions carried by said shifting bar, and cranks carried by said shafts and pivotally connected to said extensions, whereby said lamps will be shifted simultaneously with said bar and said connecting rod.

1,008,999. Metal Packing Ring. Robert B. Wasson, Cranford, N. J. Filed July 29, 1910. Serial No. 574,495.

1. A metal packing ring consisting of a split annulus of uniform cross-section, the metal of which is distorted along one of its curved sides in varying degree so as to cause the ring to exert uniform radial spring pressure.

1,009,000. Method of Making Metal Packing Rings. Robert B. Wasson, Cranford, N. J. Filed Mar. 8, 1911. Serial No. 613,005.

1. The method of making metal packing rings, which consists in producing an annular blank of substantially uniform cross-section, splitting the annulus, and permanently distorting one of the circular sides of the annulus by densifying the metal superficially and in a varying degree, ranging from maximum at the point opposite the split to minimum at the ends so as to cause the ring to exert a circumferentially-uniform radial spring pressure under working conditions.

1,009,011. Starting Device for Gas Engines. Dayton A. Baldwin, Worcester, Mass., assignor to Francis G. Crone, Buffalo, N. Y. Filed Feb. 24, 1908. Serial No. 417,548.

1. The combination of a gas engine, a carburetter, an in-take pipe extending from the carburetter to the gas engine, a gasolene supply, a pipe connecting therefrom to the carburetter, a branch pipe line extending from the supply and connected to the in-take pipe, and means for forcing gasolene through the branch pipe into the intake.

1,009,051. Tire Protector. George C. Cross, Chattanooga, Tenn. Filed Feb. 21, 1911. Serial No. 609,954.

1. A protector for resilient tires comprising a series of plates having openings in their opposite ends, transverse joint strips overlapping the joints formed between the ends of the plates and having lips intermediate of their ends engaging the openings near the ends of the plates, said joint strips having their end portions projecting beyond the longitudinal edges of the protector and formed into hooks,

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and side binders engaging the hooked ends of the joint strips.

1,009,052. Automobile Heater. Otto Cullman, Chicago, Ill. Filed Dec. 14, 1910. Serial No. 597,315.

1. The combination of a frame, plates attached to the top and bottom of the frame, heat insulating material on the lower plate and on the frame, strips extending from one side of the frame to the other side, beneath the top plate and upon the heat insulating material, supports interposed between the strips and means to hold the plates and strips rigidly to said supports, all arranged to obtain a chamber between the heat insulating material and the upper plate, and said chamber provided with an inlet and an outlet.

1,009,062. Wheel. Franklin A. Frommann, St. Louis, Mo. Filed Sept. 9, 1910. Serial No. 581,294.

1. In a vehicle wheel, a hub, a series of radially arranged plates carried by the hub, each alternate plate being pivotally connected to the hub, armored elastic members arranged between the outer ends of the plates to form the rim of the wheel, and means attached to the fixed radially arranged plates for limiting the lateral and outward movements of the armored elastic members.

1,009,068. Cranking Lever for Gas Engines. Granville W. Hoyt, Danbury, Conn. Filed Sept. 30, 1910. Serial No. 584,678.

1. The combination of the crank lever having within its outer extremity a recess, the handle having a spindle extending from its inner end within said recess and provided with an annular groove, the pin extending through said lever within said groove, the coil spring around the base of said spindle and having its extremities engaged respectively with said lever and handle, and abutting portions formed on said lever and handle whereby the independent swinging movements of said handle will be arrested in the operative and normal positions of the latter.

1,009,092. Tire Armor. Martin Pelz, New York, N. Y. Filed Jan. 30, 1911. Serial No. 605,608.

In a vehicle wheel, the combination with the felly of a wheel, of a tire carrying rim thereon, a pneumatic tire upon said rim, a series of sections of flexible material covering said tire, a U-shaped metal shield circumferentially surrounding said flexible sections, a second series of flexible sections arranged with their edges abutting against each other upon said metal shield and encircling the periphery thereof, and fastening means common to both series of sections for securing the same to said felly and preventing lateral and circumferential movement thereof upon said wheel.

1,009,103. Demountable Rim and Tire. Robert P. Scott, Cadiz, Ohio. Filed June 15, 1909. Serial No. 502,250.

1. A demountable rim and wheel structure comprising a coned wheel felly, a plain, frustro-conical band embracing the felly, a cylindrical wheel rim carrying a removable, pneumatic tire fitted to slide over the larger base of the frusto-cone but forming a clear space at the smaller base, and securing devices for preventing lateral displacement of the rim and felly, substantially as described.

1,009,121. Carburetter. Mathias Weiwoda, New York, N. Y., assignor to George W. Stevens, New York, N. Y. Filed Feb. 20, 1909. Serial No. 479,045.

1. In a carbureter, a casing, a plurality of vertically-extending plates extending from adjacent the bottom to adjacent the top of said casing forming a plurality of separate passages, a valve-controlled liquid inlet at the bottom of said casing, a float for controlling said valve, an air-delivery passage extending over a portion of the top of said casing, an air inlet at the top of said casing, and a plurality of air tubes extending through each of the separate passages downwardly from said air-delivery passage and terminating beneath the level of the liquid within said casing and intermediate said plates.

1,009,154. Jointed Wheel Tread. Louis Thomas Knowles, Minneapolis, Minn. Filed Nov. 28, 1910. Serial No. 594,531.

The combination with a wheel, of a jointed tread therefor made up of ground engaging tread links and connecting links, the said connecting links being pivotally connected to said tread links at points intermediate of the centers and ends of said tread links, the ends of said connecting links being set into the tread links so that the inner faces of said links are flush, one with the other, and the said tread links having laterally spaced retaining arms loosely embracing the sides of the rim of said wheel, substantially as described.

1,009,158. Automatic Fender for Automobiles. William A. Linquist, Minneapolis, Minn. Filed Nov. 3, 1910. Serial No. 590,462.

1. A fender attachment comprising fender supports, a fender attached to said supports and vertically movable as an entirety in respect thereto, means for holding said fender in several different raised positions, and an automatic tripping device for releasing the said fender, substantially as described.

1,009,169. Spring Wheel. Edwin G. Owen, Wysox, Pa. Filed Mar. 21, 1911. Serial No. 615,888.

A wheel comprising a hub, a rim having a rib on its inner periphery, said rib being grooved on opposite sides, spokes, supporting members for the outer ends of the spokes, said spokes having a sliding connection with the supporting members, and the latter having ears between which the rib of the rim extends, set screws threaded through the ears and extending at their inner ends into the grooves of the rib, springs abutting at one of their ends against the supporting member, an abutment for the other ends of said springs carried by the rim, abutments carried by the spokes, and springs interposed between said abutments and the rim.

1,009,193. Gravity Feed Emergency Device for Motor Vehicles. Edward C. Smith, San Diego, Cal. Filed Apr. 27, 1911. Serial No. 623,782.

1. The combination with a motor vehicle having a carburetter, a main fuel supply tank, and a main fuel supply pipe from said main tank to the carburetter, of an auxiliary supply tank near to and above the plane of the carburetter, a delivery pipe leading from the auxiliary tank to the carburetter, a stop-cock in said delivery pipe for controlling the delivery of the contents of the auxiliary tank to the carburetter, a branch pipe extending from the main supply pipe to the top of the auxiliary tank for refilling the same, and a check-valve in the main supply pipe to prevent the fuel in the delivery and branch pipes from returning to the main supply tank of the vehicle, substantially as set forth.



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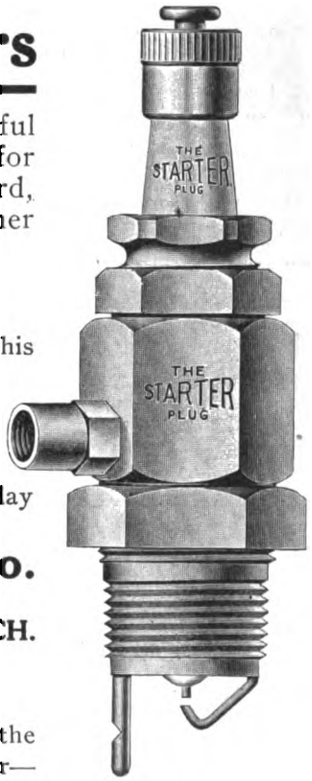


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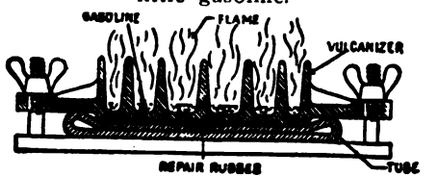
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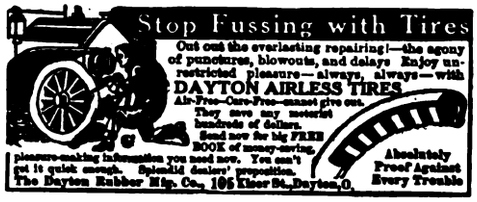
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THE NIAGARA SALES COMPANY
704 Main Street Buffalo, N. Y.

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Weed Chains

The Great Anti-Skid DEVICE

Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you cannot prevent skidding or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with Weed Chains.

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them on the front wheels too.

For your own safety—for the safety of the public, fully equip your car with Weed Chains. Make it your business to get a set today.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
28 Moore St. New York

The Name "Weed" on Every Hook

Jencick Motors

OF QUALITY

For Motor Trucks

Jencick Motor Corporation
PORTCHESTER, N. Y.

"CONTINENTAL"



Continental Model "C"

Best known motor in America.
Look for the name "Continental" on the crank case.
We have looked after the quality behind it.
4 and 6 Cylinders
20 to 60 H. P.
Write for Booklets

CONTINENTAL MOTOR MFG. COMPANY
Muskegon, Mich.

FACTORY REPRESENTATIVES:
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L. D. Bolton, ... 1810 Ford Bldg., Detroit

All Standard Bearings

are fully described in our

New Catalog 24 A

Send for it.

Standard Roller Bearing Company
PHILADELPHIA

THE MOTOR CAR EQUIPMENT CO.

The Only Exclusive Wholesale Automobile Supply House

Write for Our Complete Catalog and Revised Discount Sheet

55 Warren Street New York
Uptown Branch, 238-240 West 56th Street

$495.00 METZ 22 H. P. MOTOR CAR

The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.

METZ COMPANY, Waltham, Mass., U.S.A.

Woodworth Treads

will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.

LEATHER TIRE GOODS CO., Niagara Falls, N. Y.

INVADER OIL

"The Best the World Affords"

CHAS. F. KELLOM & CO.
Philadelphia Boston

MOTZ Cushion Tires



For Pleasure Cars and Light Delivery Cars

Send for Booklet 58

THE MOTZ TIRE AND RUBBER CO
Executive Office: Akron, Ohio

BRANCHES:
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Standard Tire & Rubber Co., 104-106 Portland St., Boston
Distributors for New England States

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
—Shows absorbing means when passing over an obstruction.

75% Increase in Tire Efficiency

That's what the INNERSHU accomplishes. It's a tough, durable, rubberized fabric formed permanently to tire shape. Ask for circular.

INNER SHOE TIRE COMPANY
Front Street Grand Rapids, Mich.

Auto-Top Fabrics

OF EVERY DESCRIPTION

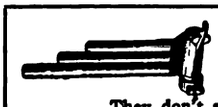
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Aluminum Bodies

THE SPRINGFIELD TOP
(Pat. 1895)

SPRINGFIELD METAL BODY CO.
366 Birnie Avenue, Springfield, Mass.



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Powerful—Musical

They don't sell on sight, but
They do sell on sound.
Write for prices and circular.
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Locomobile Cars for 1912

Complete information furnished on request.

The Locomobile Company
BRIDGEPORT, CONN.

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SPLITDORF MAGNETO

"Always There"

SPLITDORF IGNITION vindicated its claim to SUPERIORITY once more in the fastest 500-mile race that has ever been run—the 500-mile Memorial Day grind at Indianapolis.

Joe Dawson's winning SPLITDORF EQUIPPED National at an average speed of 78.72 miles per hour, demonstrated the wonderful firing qualities of SPLITDORF IGNITION at their best as world's of verbal argument could not do.

The BIGGEST and FASTEST race of its kind in the world fell as a fitting laurel into the all-conquering and convincing SPLITDORF sweep.

Merz's Stutz finishing fourth, Endicott's Schacht finishing fifth, Zengle's Stutz finishing sixth and Wilcox's National finishing ninth were also SPLITDORF EQUIPPED—rounding out 50 per cent PRIZE WINNERS for SPLITDORF IGNITION.

Can the qualities of SPLITDORF IGNITION be doubted in the face of such a commanding demonstration?

SPLITDORF IGNITION "delivers the goods." The headiest and most successful race drivers demand it—they know its constant, hot, fat firing qualities at any and every speed—they know it is reliable and that its use PRECLUDES IGNITION TROUBLES.

JUST INSIST UPON TRYING IT—we will gladly shoulder all responsibilities for changes and adjustment and GUARANTEE SATISFACTION.

Write for our "Racing Record."

Splitdorf Electrical Co.

Walton Ave. and 138th St.
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BRANCHES:

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SAN FRANCISCO.....430-436 Van Ness Avenue
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A TWITCHELL AIR-GAUGE at $1.00



Statistics show that 26 per cent. of all tire trouble is caused by improper inflation.

Statistics show that you can take one thousand miles of service out of a set of tires by driving them partially inflated over ten miles of road. This means you can only get Big Mileage out of tires inflated to the right pressure.

The Twitchell Air Gauge

tells you in a minute if your tires are properly inflated. That is why the TWITCHELL AIR GAUGE is tire insurance; that is why it is a guarantee of maximum tire efficiency.

You simply apply the gauge to your valve and the indicator shows your tire pressure. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.

Price $1.00 Each

Now Ready for Shipment
Can Be Obtained From Your Dealer

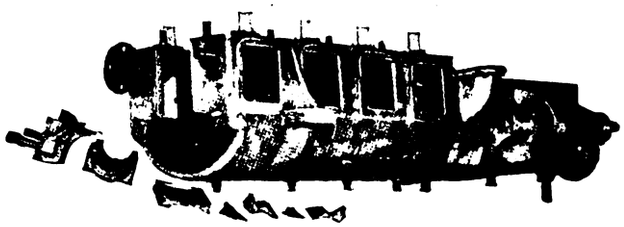
Twitchell Gauge Mfg. Co.

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CHICAGO, ILL.

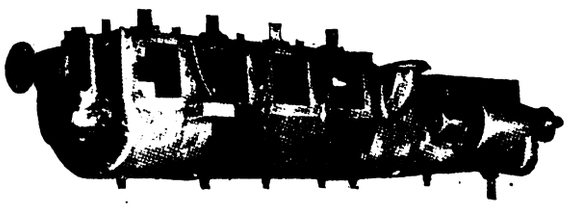
or A NEW SET of TIRES at



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Aluminum crank and gear case, combined, worth $96, with end bearing and part of end broken out.



Same crank and gear case with end bearing welded with Prest-O-Welder. Complete cost of repair only $7.75

Prest-O-Welder

Will Pay Big Profits to Garages, Manufacturers, Machine Shops

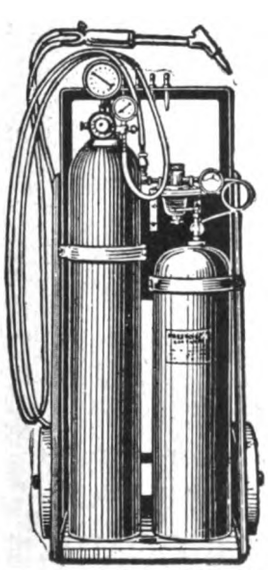
The pictures above tell the story. $96 worth of material saved for $7.75.

The profits from this piece of garage equipment will pay you back its cost and big profits in a short time.

The Prest-O-Welder is always ready for instant use—needs no attention beyond opening two valves when you are ready to use it.

It welds brass, bronze, aluminum, steel and cast iron with a strong, seamless surface.

It is mounted on a compact, two wheel truck and can be used in any part of the shop.



By its use thousands of men are going to build up big paying businesses. Millions of dollars worth of parts are thrown away that can be made good as new by welding.

Don't let the opportunity go by. Figure the profits that this proposition means. Learn how we help you to build up business with the Prest-O-Welder.

Learn how automobile parts costing $326.00 to replace, can be welded for $11.78. We stand ready to prove these facts to your satisfaction.

Send today for the Prest-O-Welder literature giving full information, explaining the operation and construction and showing how the most difficult welding jobs are done.

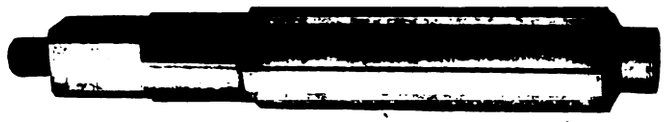
The Prest-O-Lite Company

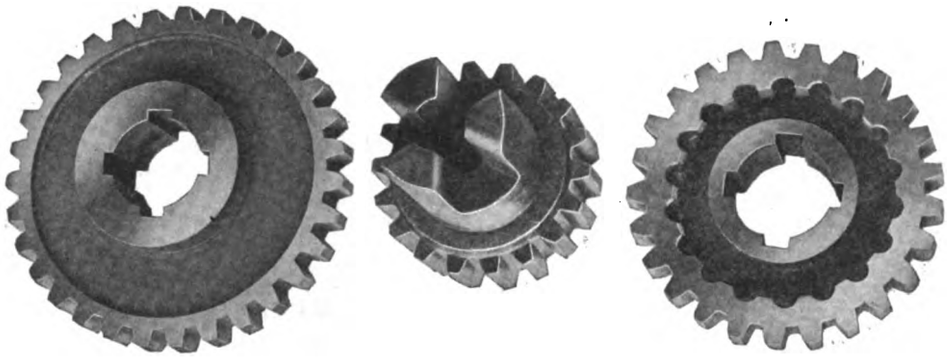
WELDING DEPARTMENT

287 W. South Street Indianapolis, Indiana

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GRANT-LEES GEARS





The plant that produces 300,000 gears a year can manufacture gears of quality at the lowest price per gear.

We build and guarantee the transmission and clutch used in the Grant Six.

THE GRANT-LEES MACHINE COMPANY, Cleveland, Ohio

Pioneer Helical Gear Makers in America



THINK THIS OVER very carefully and read it, twice, if necessary.

Is there any part of an automobile engine, or any other gas engine, that is more important to its efficiency than a Valve?

Your engine leaves the factory running smoothly and sweetly—tuned up to its highest power. Perhaps the valves pit—warp - go out of shape—fail to hold compression. Then the power diminishes, and what can be more aggravating to the driver, who has known the fullness of the pulling power of his motor, than to have it grow less and less?

You cannot slight this part by putting in an inferior product—valves that will give trouble, or even break from inexperience in their manufacture—valves of unsuitable material, not suitably heat treated.

Too much is at stake, and a slight extra cost at the outset, which is the exception, may save you many times over a probable later expense.

This Company, with the experience of many years as a guarantee, will furnish you with properly made valves, of the materials best adapted to your requirements.

Not only QUALITY, but efficient SERVICE is a factor—surely there is a satisfaction in getting the kind of work you want—when you want it.

THE ELECTRIC WELDING PRODUCTS COMPANY

CLEVELAND, OHIO

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Diamond Tires

We could build them cheaper
But We Won't

We would build them better
But We Can't

THERE are two good reasons for your handling Diamond Tires rather than any other—

¶ You'll do a bigger tire business and do it with less effort.

¶ And you'll do a bigger business in all other lines you handle.

¶ Everybody knows that Diamond Tires set the tire standard in America—

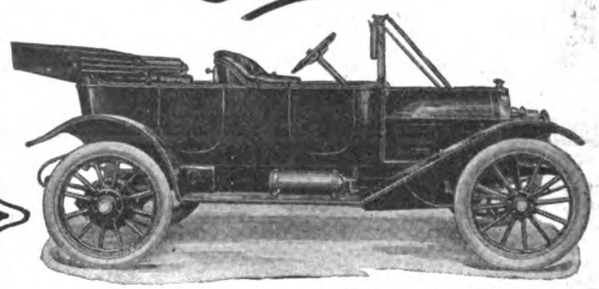
¶ And everybody will believe that a dealer who handles Diamond Tires handles quality supplies straight through.

¶ That's a reputation worth getting—and you will get it if you let Diamond prestige work for you.

We publish a magazine for dealers. It's worth getting. Send in your name. We want you to have it.

The Diamond Rubber Company
Akron, Ohio

4 Square Reasons Why You Should Choose the Glide



EFFICIENCY
For style, comfort, luxury, quality of construction, mechanical perfection—in all that goes toward a car's efficiency, the buyer of a "Glide" actually gets more automobile value than can be obtained from cars costing at least $1,000 more.

SERVICE
The "Glide" is not the only first-class car on the market, we admit that. But unlike other automobiles, the "Glide" is not merely a "one-year" car. We make the "Glide" for 5 to 7 years' continuous service. This we guarantee.

PRICE
While the "Glide" is not a high-priced car—remember it is not a cheap car. The standard of construction equals that of cars costing the highest price. Consequently the buyer gets a car second to none in quality at a cost that's as low as any standard make.

GUARANTEE
The purchaser of a "Glide" is protected by a guarantee more liberal and wider in scope than any other guarantee ever issued. Read it in the FREE book—sent on request. It will surprise you.

Our New Model 36-42 H. P.

Complete Equipment

$1550

The careful buyer, and the dealer who is alive to the real automobile situation are invited to write for handsome FREE book and learn from this book why the Glide is ***best.*** Booklet pictures and describes full line including Two and Four-Passenger, 45 H. P. Cars, $2,000; Five-Passenger "45," $2,150; Seven-Passenger "45," $2,250.

New Selling Agencies

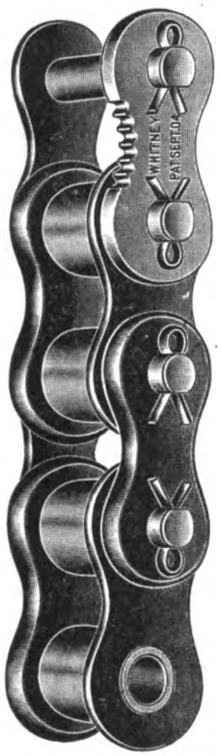
are now being established in select territory. If interested, write us for our special proposition. "Glide" dealers can offer their trade a car that combines quality and service that at the price has never been equalled. Get this FREE book and full details.



The Bartholomew Company
220 Glide Street, Peoria, Ills.

We make cars of all kinds for all occasions and purposes. FREE book pictures and describes the full line, send for it.

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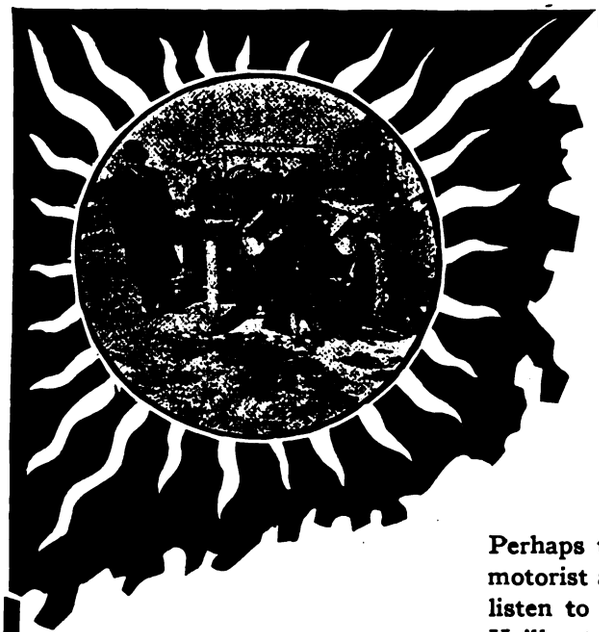
The Greatest Mileage

can only be obtained by the use of materials properly hardened which will resist the most wear. Through our untiring efforts to produce nothing but the best and our years of experience in chain making, "Whitney" Chains have gained a remarkable reputation for their strength, accuracy, wearing qualities and ease of repair.

The "Whitney" Cotter Detachable Chain is the most practical chain for motor trucks, because it can be taken apart at any link and lengthened, shortened or repaired without the use of any special tool. When making replacements insist on a "Whitney" and get acquainted with its merits.

Look for the Cotter Pins

THE WHITNEY MFG. CO., Hartford, Conn.



You Can Bet Your Last Dollar

THAT HE DOESN'T OWN A

"REFLEX"

THE LIGHT THAT NEVER FAILED

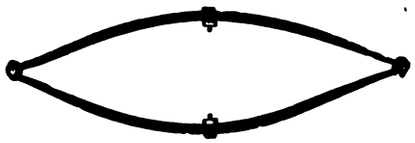


Perhaps the man standing at the side of the car is telling the unfortunate motorist about the "REFLEX" but the unfortunate motorist is too "sore" to listen to suggestions. His temper and his language will stand questioning. He'll get a "REFLEX" when he cools down—that's certain. The "REFLEX" Inspection Light is not only a time, temper and money saver, but a life saver as well. It eliminates all danger of explosion—no soot—no smoke. All parts of object seen at one time. Full details of its construction and efficiency together with price lists mailed on request. Send now.

REFLEX INSPECTION LIGHT SALES COMPANY

35-37 South 3rd Avenue **Sole Rights for United States** **MT. VERNON, N. Y.**

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Spring service of the highest type is guaranteed manufacturers who equip with

PENN SPRINGS

The tests applied to every finished spring is severe. Resiliency, tensile strength and shock resistance are proved.

Any spring showing the slightest imperfection, weakness or inaccuracy is thrown aside and so only the best and most perfect products of this plant go to equip cars of quality and endurance.

PENN SPRING WORKS

Baldwinsville, N. Y.

FEDERAL "Extra Service" TIRES



Extra service in every tire

That's why Federal Tires are the most economical you can buy. The additional mileage they give means a substantial reduction in upkeep. Test them.

Only the best quality of long fibre Sea Island cotton fabric is used in Federal "Extra Service" Tires. Secret processes of treatment convert this important part of the tire carcass into the strongest and most durable fabric ever used in automobile tires.

The finest up-river Para Rubber is used in constructing the tread of Federal "Extra Service" Tires. This tread stands hard "road wear" because it is produced under improved methods which give it remarkable toughness and durability.

The carcass and tread in assembled state are "wrapped" and cured integrally, under compression, in open steam, uniting all parts into one combined form of exceptional quality and merit—Federal "Extra Service" Tires.

Made in all types for all standard rims.

Federal Rubber Manufacturing Co.
Milwaukee

Branches and Agencies—*New York, Boston, Chicago, Kansas City, Minneapolis, Denver, Indianapolis, Columbus, St. Louis, Louisville, Omaha, Houston, San Antonio, Little Rock, Atlanta, Los Angeles, San Diego, Pasadena, New Orleans, Portland.*

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Dependable Deliveries



DELIVERY dates are of utmost importance. Delay in shipments means loss of money.

We guarantee prompt deliveries.

Warner Quality and Warner eight-year old reputation for making highest class gears is back of the product.

Car makers interested in the Quality and Merit that means absolute safety and satisfaction will do well to write.

We modify our designs to meet detail requirements, or build to approved designs on seasons **quantity specifications.**

Philadelphia, Glenwood Av. and 2nd St.
Detroit, 628 Ford Building

Warner Gear Co.
Muncie - Indiana

Self Hanna Starter

Watch the Prices Drop!

Just as the Hanna self starter—the only 100% efficient self starter that does not foul or soot your plugs—was imitated by those who followed our lead so now is the price of the Valentine manifold starter being met.

Remember We Were the Originators

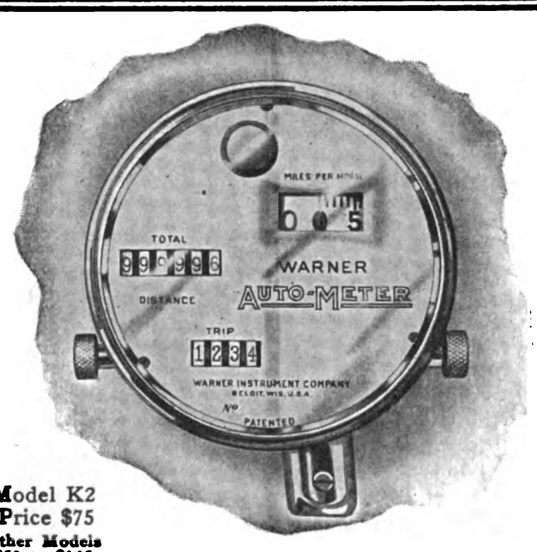
Not only were we the first to produce an acetylene self starter but we were first to introduce a manifold self starter at the right price, $10.

Our Price Does Not Cut the Dealer's Profit

Still some fine territory open. The profit is big. Our goods are right and fully guaranteed. Write today.

J. H. VALENTINE COMPANY
Syracuse, New York

The Valentine Manifold Starter and Gas Lighter



Model K2
Price $75
Other Models
$50 to $145

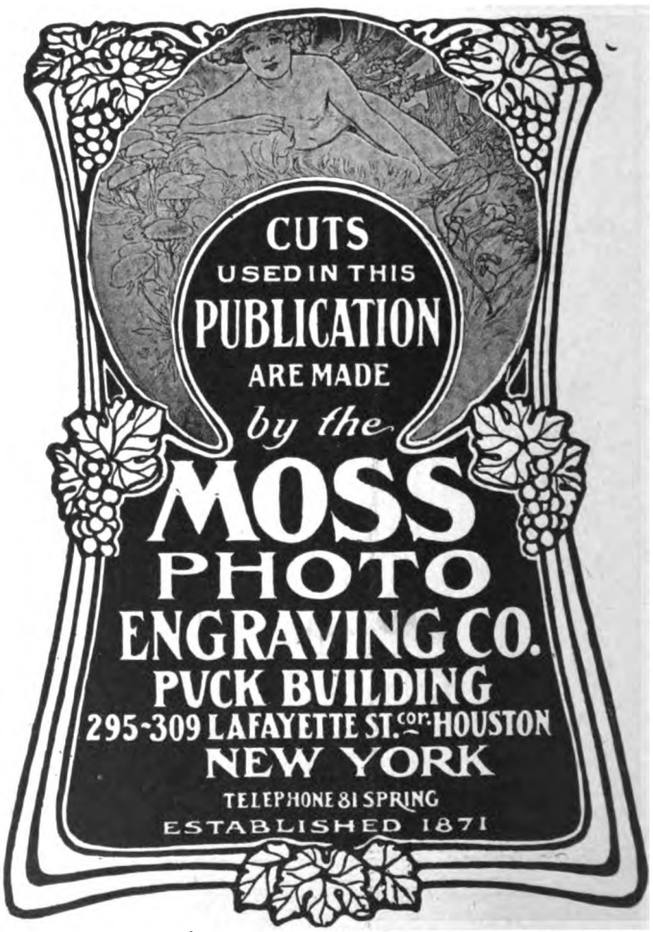
WARNER
AUTO-METER
"The Aristocrat of Speed Indicators"

AUTO BUYERS are now insisting on **complete cars.** A good car is not complete without a Warner on it. It is the only speed indicator of even quality with a high grade car.

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

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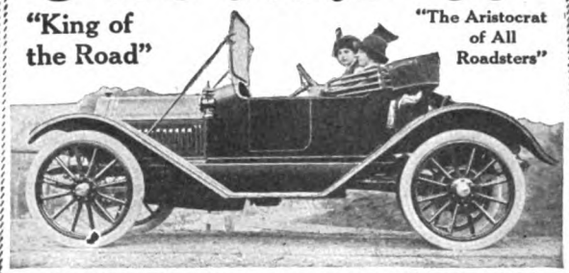
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MAINE DREADNOUGHT

Moline "35"

"King of the Road"

"The Aristocrat of All Roadsters"



LOW, RAKISH lines; self-starting; long wheel-base; 36-in. wheels; 3½-in. tires; torpedo type, straight-line, foredoor body; low, roomy seat; extra large steering wheel, with spark and throttle conveniently placed for thumb and finger control; black and nickeled trimmings throughout; finest leather upholstering over soft springs and best curled hair; large oval gasoline tank on rear deck. Full equipment, including best mohair top, dust cover, wind-shield, speedometer, horn, tools and extra tire with cover. **PRICE, $1,700.**

4x6 Long-Stroke Motor

—silent, powerful, economical. The longest stroke motor used in any American car. The mechanical masterpiece that won four great road victories in 1910-11. Write for Catalog

Three other styles for 4 and 5 passengers—all self-starting.

MOLINE AUTOMOBILE COMPANY

61 Keokuk Street, EAST MOLINE, ILL.

DEALERS: No other car offers you equal opportunities in sales, satisfaction and success.

Great Northern Hotel

CHICAGO

Ideal Headquarters for Automobilists

Rates:

Without Private Bath
$1.50 and $2.00

With Bath
$2.50 to $4.00



Large, Comfortable Rooms

Grill Room Popular Prices

Cafe on Parlor Floor

Service and Appointments Most Approved

Most centrally located hotel in Chicago and absolutely of fireproof construction.

Jackson Blvd., Dearborn and Quincy Sts.

JOHN C. ROTH, Managing Director

Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER UNIVERSAL Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each

Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.

28-32 Rose Street New York City

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"Look at the rear springs" if you want to know why some cars ride easier than others—why even one or two people can ride in comfort in a seven-passenger car.

It's because they are equipped with

"J. M." SHOCK ABSORBERS

insuring — despite rocks, ruts and bad roads — greatest comfort at high speed and *reduced* wear and tear on tires.



The term "shock absorbers" does not fully describe the "J. M."—they not only *absorb* all jolts and jars, but they actually *prevent* them by holding the rear wheels to the ground.

The unique construction of the "J. M." makes them perfect supplements to the rear springs of the car, preventing:

First, the "racing" of your engine, caused by the rear wheels leaving the ground.

Second, engine shocks and tire grinding caused by the car returning to the road with a thud.

Learn at our expense how to get the most comfort and longest service from your car—don't pay us a cent until the "J. M." Shock Absorber proves our claims.

Made in three models—attachable in an hour, detachable in 15 minutes.

Prices: $35.00 to $50.00 per set.

Write on your business letterhead for booklet W and full information. Mention the name, model, weight and width of rear springs of the car you run.

The "J. M." Shock Absorber Co.

Main Office and Factory, 210 South 17th St., Philadelphia, Pa.

New York, N. Y., 218 West 84th St.
Chicago, Ill., 1509 Michigan Ave.
Boston, Mass., 222 Eliot St.
Buffalo, N. Y., Teck Building.
Rochester, N. Y., 334 East St.
Pittsburgh, Pa., 5919 Baum St.
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Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY DURABILITY

One, Two and Three Ton Capacity

LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

Reliable Agents: Secure Your Territory for 1912 at Once.

THE LAUTH-JUERGENS MOTOR CAR CO., Fremont, Ohio

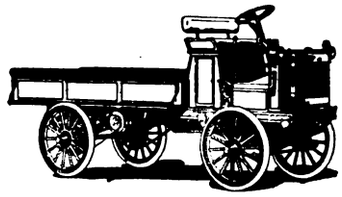
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CHICAGO—The Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
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Sanford

Above all things else sell trucks that are accessible.

Chassis $1600



Stake or Express Body $1750

It is not enough that the truck of today should be well built—the truck of today must be accessible.

There is no truck more accessible than the Sanford, nor is there a truck more substantially built.

This means that repeat orders are assured to dealers who sell Sanford trucks.

If the Sanford truck is not sold in your territory, get in touch with us right away. No manufacturer has offered to dealers so remarkable a proposition as we offer.

The Sanford Motor Truck Co.
SYRACUSE, NEW YORK

Ford

THE UNIVERSAL CAR

If you Ford it—you'll cut the world in half, double the length of your day, and increase your pleasures tremendously. Your debt to yourself will never be paid until you drive a Model T. It's the one car that completely fulfills its purpose—without excessive expense.

Seventy-five thousand new Fords go into service this season—proof of their unequaled merit. The price is $590 for the roadster, $690 for the five passenger car, and $700 for the delivery car—complete with all equipment, f. o. b. Detroit. Latest catalogue from Ford Motor Company, Detroit, Mich.

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AJAX TIRES

(Guaranteed 5000 Miles)

Have Stood the Test of Time

Protect yourself in buying tires. Ajax Tires have been proven in many hard fought endurance contests. You may pay more but you cannot get more value. Our guarantee is an assurance to you of long service and satisfaction.

Ajax Tires have saved money for others. Is there any reason why they should not save money for you?

DEALERS: The repeat order is the real proof of satisfactory service. It means that the motorist is thoroughly satisfied with his purchase. Practically all our customers are repeaters. Have you our latest proposition? If not, write today.

AJAX-GRIEB RUBBER CO.

General Offices: 1796 Broadway, New York City

Factories: Trenton, N. J.

Branches in Principal Cities

Bosch Plugs

As Good as Bosch Magnetos

OF the 10 prize winning cars in the 500 Mile Sweepstakes of May 30th, all but the 10th car used Bosch Plugs.

One, two, three—was the order of the cars using Bosch Plugs in the recent Santa Monica Road Race.

One, two, three, Bosch Plugs—was the order in the Grand Prize Race—*of course.*

Better proof could not be given.

Be Satisfied **Specify Bosch**

Bosch Magneto Company, New York

ANDREWS-DYKEMAN CO.

N. E. DISTRIBUTORS OF MOON CARS

MOON CARS

19 COLUMBUS AVE. BOSTON, MASS

March Twenty-Sixth, Nineteen Twelve

Remy Electric Company,

Boston, Mass.

Gentlemen:-

Attention Mr. Layton.

In response to your request of recent date, we take great pleasure in writing you this letter expressing our appreciation of the service your people have extended to us, and the business like way you have of looking after our customers. We wish to say that we have had entire satisfactory with Remy Ignition and cannot praise Remy service any too much.

Trusting this letter will be of value to you, we are,

Yours very truly,

ANDREWS-DYKEMAN COMPANY

A postal will bring scores of letters like these. Remy Electric Co. Anderson, Ind.

1,000 Island House

ALEXANDRIA BAY

Jefferson County **New York**

IN THE HEART OF THE THOUSAND ISLANDS

In the most enchanting spot in all America, where nature's charms are rarest, all the delights of modern civilization are added in the 1,000 Island House. No hotel of the Metropolis provides greater living facilities or such luxurious comfort—real **home** comfort—as does this palatial Summer retreat. An amusement for every hour, or quiet, complete rest, is the choice of every guest.

ALL DRINKING WATER USED IN THE HOUSE IS FILTERED

Send two 2-cent stamps for Illustrated Booklet.

O. G. STAPLES, Proprietor

HARRY PEARSON, Chief Clerk.

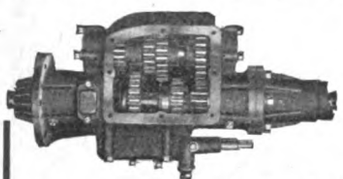
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BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

COVERT Transmissions



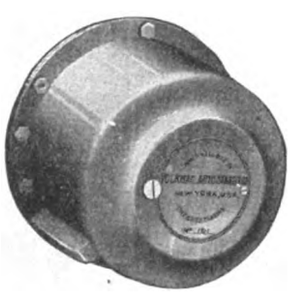
will help bring your car to the standard of efficiency that you are working for. Every gear shaft and bearing is made of nickel steel, heat treated and accurately ground. All material and workmanship is guaranteed. Will be glad to talk with you about them.

COVERT MOTOR VEHICLE CO.
Sales Office: Ford Building, Detroit, Mich.
Factory: Lockport, N. Y.

United States Tires



ARE GOOD TIRES



Volkmar Auto Starter

Safe Efficient
Convenient Economical

A SPRING starter of Simple Perfection, ABSOLUTELY AUTOMATIC action and FULLY GUARANTEED.

Live Agents Wanted.

VOLKMAR AUTO STARTER COMPANY
164 Fulton Street New York, N. Y.

If there is no PULLMAN agency in your territory let us hear from you at once. Our 1912 line includes the famous PULLMAN "4-30," "4-35," "4-50" and our two big leaders, the "4-40" and "6-60." The equipment includes self cranking motor, electric lighting device, top, windshield, speedometer, foot and robe rails, etc.

PULLMAN cars "lead the leaders." Some of our agents sell as many as 200 PULLMAN automobiles each year. Let us put you in touch with our agents and find out for yourself why PULLMAN agents are always good agents.

"OUR OFFER"—If there is no PULLMAN agency in your territory we will arrange to "show you" at absolutely no expense to you.

PULLMAN MOTOR CAR COMPANY
222 N. George Street YORK, PA.

Drop Hammer Forgings

cost very little more than castings. They are vastly superior and less expensive in the end.

WE ARE SPECIALISTS
in producing
DROP HAMMER FORGINGS
from special analysis steel.
Send prints of parts you will need in
1913.
QUALITY AND SERVICE GUARANTEED
THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

IF YOU ARE INTERESTED IN
MOTORCYCLES
THE BICYCLING WORLD AND MOTORCYCLE REVIEW
WILL INTEREST YOU

PUBLISHED EVERY SATURDAY AT
1600 BROADWAY, NEW YORK
$2.00 Per Year *Specimen Copies Gratis*

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WINTON SIX

The Real Meaning of Service

Every car buyer is entitled to **Service.** But many buyers will never get it. The reason why they will never get it, the reason why their hope is vain, is told in our latest booklet, "The Real Meaning of Service." We shall be glad to send a copy to you.

THE WINTON MOTOR CAR CO.

426 Berea Road **Cleveland, O.**

The World's First Maker of Sixes Exclusively

Abbott-Detroit 1912 MODELS

MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY

607 Waterloo Street **Detroit, Michigan**

Hupmobile

Long-Stroke "32"
Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.
Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

20 H. P. Models

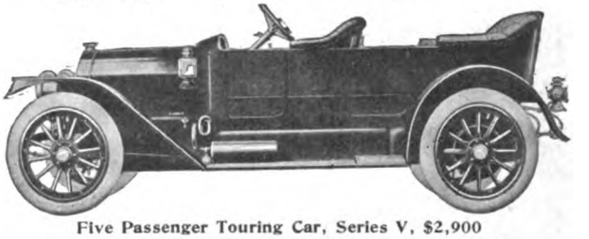
Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Electric headlights, electric and oil side and tail lamps, folding dash seat for third person. Rear tires, 31 x 3½ inches. With 110 inch wheelbase, $1150.

HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

Stock Champion **International Champion**

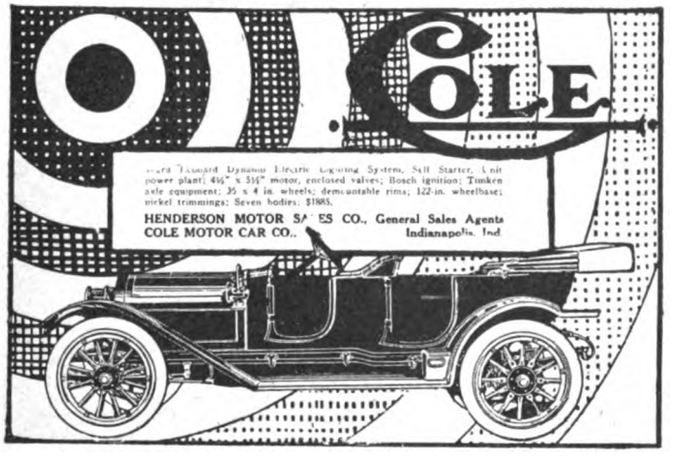
National 40



Five Passenger Touring Car, Series V, $2,900

NATIONAL MOTOR VEHICLE COMPANY

1007 E. 22nd Street **Indianapolis, Ind.**



Mais Motor Trucks

Internal Gear—Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.

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The Car with a Conscience

All Four Cylinder Models
$1200 to $3000
30, 40, 45 Horse Power Ratings
Limousines, Touring Cars, Coupes and Roadsters

WRITE FOR CATALOGUE

OAKLAND MOTOR CAR CO.

250 Oakland Ave., **PONTIAC, MICH.**

Empire Twenty-Five

The Little Aristocrat

This is the Big Brother of the Famous Empire Roadster and is a small edition of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.

224 Massachusetts Street **Indianapolis, U. S. A.**

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Apco

ELECTRIC LIGHTING SYSTEMS

are known everywhere that automobiles are used because they were the first made and because every year shows refinements in their construction that makes them more desirable.

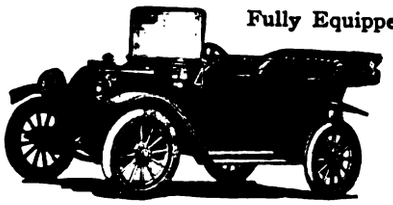
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THE APPLE ELECTRIC COMPANY
18 N. Canal Street **Dayton, Ohio, U. S. A.**

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

BRIGGS-DETROITER CO., 449 Holbrook Ave., Detroit, Mich.

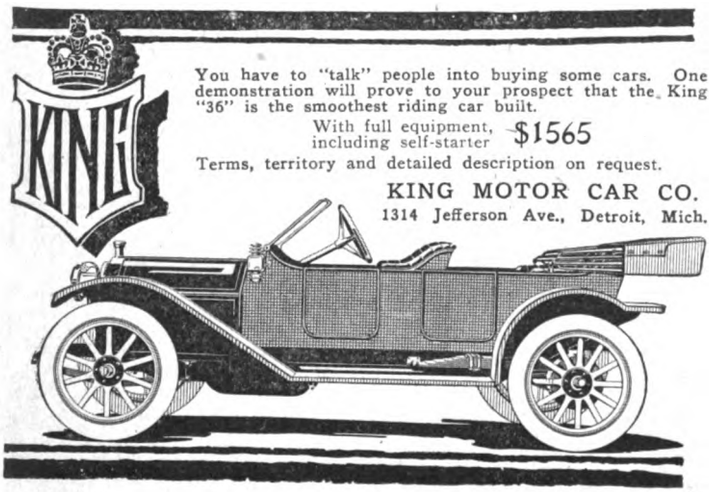
KING

You have to "talk" people into buying some cars. One demonstration will prove to your prospect that the King "36" is the smoothest riding car built.

With full equipment, including self-starter $1565

Terms, territory and detailed description on request.

KING MOTOR CAR CO.
1314 Jefferson Ave., Detroit, Mich.



The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS - SIX - HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

Full specifications sent on request.

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

cartercar

Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.

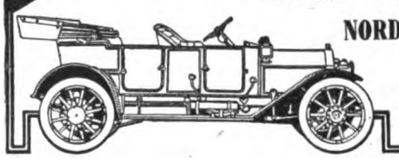
CARTERCAR COMPANY, Pontiac, Michigan

The Easiest Riding Car in the World

MARMON

A rational, logical car, made on one chassis—a body type for every requirement. Touring car, $2,750.

Ask for Catalog.



NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

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THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta, Minneapolis and San Francisco



The American Underslung

WE have published a very interesting book on the advantages of Underslung construction. It is of value to dealer or individual. It tells of our full line which ranges in price from $1425 to $4500. Write for a copy.

American Motors Co., Dept. E, Indianapolis, Ind.

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Start Your Car 25 Times for a Cent

INVINCIBLE STARTER

will start any four-cycle engine of four or six cylinders. Turn on the switch—that's all.

Price, NOW, Only $10

Fully guaranteed. Money back if not satisfied. Send your order today, stating make and model of your car. Illustrated Catalog Free.

INVINCIBLE STARTER CO., 748 Penobscot Bldg., Detroit, Mich.

ANNOUNCEMENT

Pleasure Cars	-	7 Models	$850 to $3500
Delivery Cars, Trucks	-	4 Models	

Now Closing 1912 Contracts

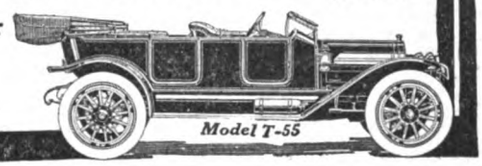
PETREL MOTOR CAR COMPANY
2530 First Avenue — Milwaukee, Wis.

THIS *Cutting* CAR

Has more Horsepower and a longer Wheel Base than any other Four Cylinder Automobile in the World selling for this price $1850

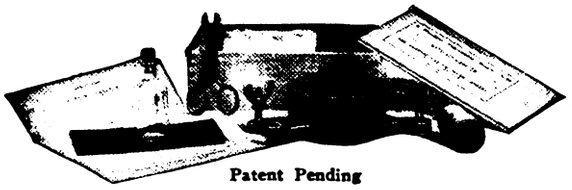
Send for our Chart of Comparative Motor Car Values

Clarke-Carter Automobile Company
Jackson, Mich.



WARNING

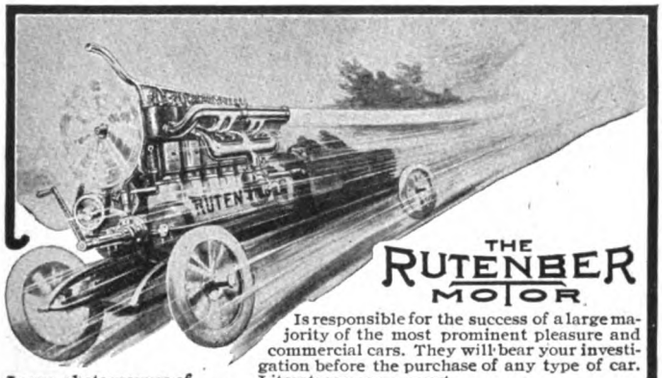
PATENT NOTICE—Notice is hereby given to the trade, including manufacturers, sellers and users, that the undersigned own all patent rights pertaining to an apparatus for the repair vulcanization of tires, now being manufactured and sold by them, and known to the trade as the AUTO VULCANIZER; that steps have been taken to secure the necessary patent protection thereon in the United States Patent Office; and that basic claims covering said apparatus have been declared to be allowable to the applicant under whom they claim title. Warning is hereby given that immediately upon the issue of said letters patent such action will be taken against all infringers, whether making, selling or using said apparatus, or any infringement thereof, as may be necessary to fully establish their rights to the same in the premises. For your protection look for the name.



Patent Pending

ADAMSON Auto-Vulcanizer
Ever-Ready
Price, $3.50

THE ADAMSON MANUFACTURING COMPANY, Manufacturers, East Palestine, Ohio



Large photogravure of the above cut for framing 14c in stamps.

THE RUTENBER MOTOR

Is responsible for the success of a large majority of the most prominent pleasure and commercial cars. They will bear your investigation before the purchase of any type of car. Literature upon request.

THE WESTERN MOTOR CO., Marion, Indiana

The Motor Lamps with Distinctive Features

There are no other motor lamps on the market with the advantages of Solar Lamps. Solars are always exclusive in style and in quality. They are the strongest lamps as well as the most effective.

In no other lamps can you obtain the Solar Special Short Focus Lead Glass Lens Mirror Reflector—the patented system of double ray light projection which gives two distinct fields of light for town and country use—or the new and exclusive black finish with a metallic lustre which is unaffected by heat or moisture. All of these features are exclusively "Solar."

Do not equip your car or specify equipment to the maker until you have seen all of the Solar advantages. See Solars at any live dealer's or write for the catalog.

Solars are made in all styles for oil, electricity, gas and in combinations.

Solar Lamps

BADGER BRASS MANUFACTURING COMPANY
Kenosha, Wis. (137) New York City

"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.

AUTOMOBILE OWNERS AND TOURISTS

should break their journey and avail themselves of the excellent facilities afforded by the D. & C. Lake Lines, operating daily service between Detroit and Buffalo and Detroit and Cleveland.

Enjay the delights of the cool breezes from Lake Erie and resume your journey in the morning after a refreshing night's rest. Special attention given by this Company to the handling of automobiles. Rates quoted on application (state wheel base); Tanks of Automobiles must be emptied of gasoline before being shipped; three gallons of gasoline supplied free on arrival at destination.

Roads in this section of the country are in first class condition; new road now under construction between Detroit and Toledo. Tourists speak highly of the route between Buffalo and New York.

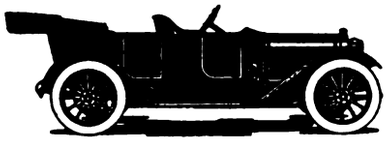
On your trip this summer bear in mind "The Waterway is The Only Way."

DETROIT & CLEVELAND NAVIGATION CO.,
General Offices, Detroit.

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Empire Tires
WEAR LONGEST
EMPIRE TIRE CO., Trenton, N.J.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

MICHIGAN BUGGY COMPANY, 188 Lay Blvd., Kalamazoo, Mich.

THE CENTURY

A Car Embodying Advanced Ideas in Electric Car Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

K. D

The Motor With the Sliding Crescent Valve

KNIGHT-DAVIDSON
1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

KNIGHT-DAVIDSON

The Kinsey Manufacturing Company
TOLEDO, OHIO

Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE

Makes a Big Winner in Philadelphia

Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager, 1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

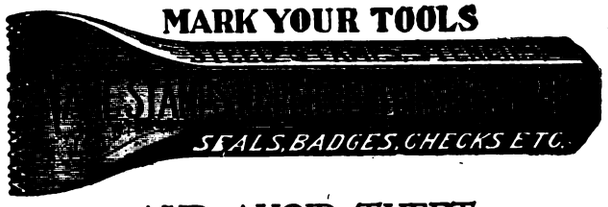
H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

Philadelphia, Pa., 1418 Blavis St.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

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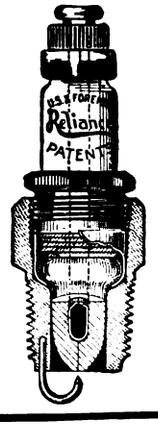


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AND AVOID THEFT

Take advantage of this special offer, which lasts for 30 days: Upon receipt of cash with order we will make your stamp for 10 cents per letter. Send us your order now.

THE SACKMANN MFG. COMPANY
88-90 Canal Street AKRON, OHIO



Soot and Carbon CAN'T collect on Reliance Spark Plugs, and impair their efficiency. The patented electrical action of the Reliance prevents it. Soot and carbon are destroyed before being deposited.

If you drive an automobile you want Reliance Plugs. If you build automobiles equip them with Reliance plugs and please the purchasers. You can't furnish better plugs.

JEFFERY-DEWITT CO.
65 Butler Avenue Detroit, Mich.
Largest Exclusive Spark Plug Manufacturers in the World.

If you are interested in

FEDDERS RADIATORS

we would like to send our latest catalogue.

Fedders Manufacturing Works
57-67 Tonawanda St. BUFFALO, N. Y.



Patent "Luxury" Folding Seats

Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

HODGE & GRAVES CO.,
Amesbury, Mass.

Price **$20**
Without Cylinder Attachments

"The Crankless" STARTER

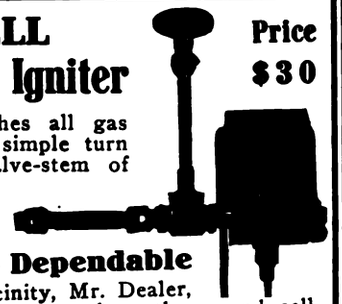
By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.

Guaranteed by our 40 years standing and reputation.

COX BRASS MFG. CO. Established 1872 **Albany, New York**

THE GRINNELL Gas Controller and Igniter

Price **$30**



Lights, dims and extinguishes all gas lamps on the car through a simple turn of the hand. Coupled to valve-stem of acetylene tank. Direct control. Always within easy reach.

Convenient — Safe — Dependable

Every car owner in your vicinity, Mr. Dealer, will be interested—it's up to you to show them—and sell them. Write for booklet and dealer discounts.

THE G. C. A. MANUFACTURING CO., Pittsfield, Mass.
Sole Licensed Manufacturers for the United States

No Cranking! No Pumping!

START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

American Starter and Carburetor Mfg. Co.
2022 S. 40th Avenue CHICAGO, ILL.

Raybestos REG. U.S. PAT. OFF.

LOOK FOR THE TRADE-MARK

Every foot of RAYBESTOS is stamped with our trade-mark. This protects you and your car. Be sure your brakes are lined with

TRADE MARK **Raybestos** REG. U.S. PAT. OFF.

It has the highest coefficient of friction. Made of asbestos, woven with copper wire. Heat-proof, oil-proof, gasolene-proof, and as for water—it has absolutely no effect on this lining.

THE ROYAL EQUIPMENT COMPANY
436 Housatonic Ave. BRIDGEPORT, CONN.
Manufacturers of Duplex and Raymond Brakes and Gyrex—The Mixer.

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FIAT

"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500
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The Electric Car of Quality

THE COLONIAL

Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

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Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
Model 41—4 Passenger Demi Tonneau.
Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke. 40 H. P. $2400

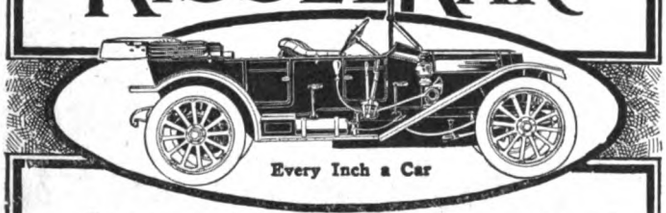
Model 50—7 Passenger, Fore Door Touring Car.
Model 51—4 Passenger Demi Tonneau.
Model 52—Roadster type—all with the new "T" head 5 in. bore, 6 in. stroke motor. 50 H. P..... $3400

Model 30-A—Fore-Door, a 40 H. P., 5 Passenger Touring Car at $1750
Model 32-B—A 40 H. P. Roadster at - - - - - $1700

All fully described in our Art Catalog. Send for one today.

Inter-State Automobile Co., Dept. O Muncie, Ind.
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Every Inch a Car

Extra liberal wheel base, extra big wheels and tires, full equipment, demountable rims, 4 speed transmission, 30, 40, 50 H. P., 4 cyl. models, $1,500, $1,850, $2,350; 6 cyl., 60 H. P., $3,000. Full line of trucks and delivery wagons. Write for 1912 portfolio.

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Sets a new mark in quality, service, efficiency and economy.

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Motor Car Manufacturers Since 1893

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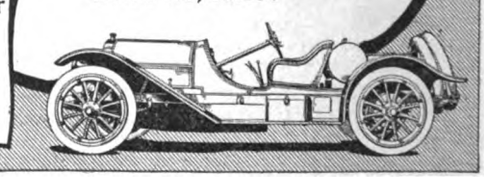
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A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.
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2-Passenger
Equipped
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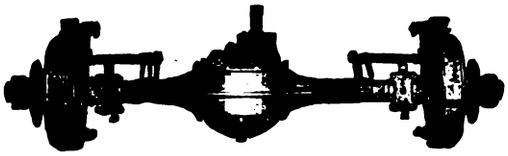


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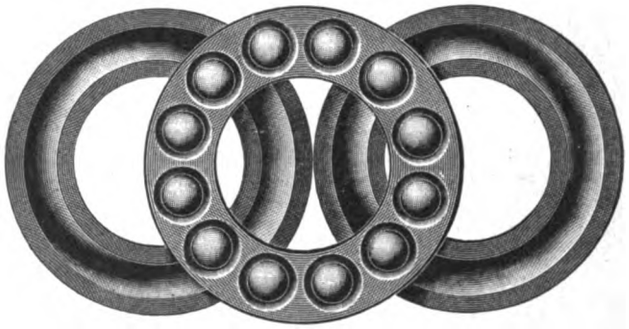
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It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

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Better Than Commercially Perfect
GEARS
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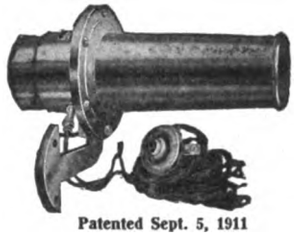
$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

Brown-Lipe-Chapin Company
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Bower Roller Bearing Co.
DETROIT, MICH.
Manufacturers of High Grade
ROLLER BEARINGS
For All Purposes



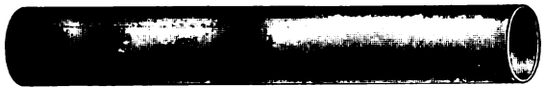
Our Consulting Engineering Department is always at your service.
Send for catalog, price-list and specification sheets of sizes.



Patented Sept. 5, 1911

NEWTONE
The Mile-Away
MOTOR HORN
Torpedo Type
Once Hear It and You'll Want No Other
The Most Perfect Warning Signal
EFFICIENCY and ECONOMY
Price $20 Complete, Including Button and Cable
AUTOMOBILE SUPPLY MANUFACTURING COMPANY
220 Taaffe Place Near DeKalb Avenue BROOKLYN

Cored Bars for Bushings

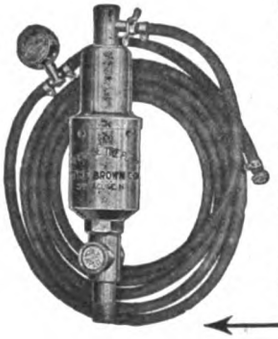


All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.

Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.

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Fool Proof—Because it has no complicated mechanism, only one moving part. Can't get out of order.

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Not a luxury but a NECESSITY if you want your tires to give good service.

Price $15.00 including 12 feet of hose, HIGH GRADE RECORDING GAUGE AND SELF OPENING VALVE CONNECTION.

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Durability, Economy, Reliability, Power and Speed make our satisfied customers.

4 Speeds Forward **KLINE KAR** Self - Starting

MR. DEALER, GET WISE—A line of high grade cars at prices that people are paying for cheap cars. Write us today.

4-30	$1700 $1750	4-40	$2200 $2250	6-50	$2800 $2850	6-60	$3300 $3500

All Models Completely Equipped.

KLINE MOTOR CAR CORPORATION, York, Pa. Factories: York, Pa. Richmond, Va.

Repair Parts For MORA Transmissions

We have in stock all parts for the transmissions of MORA automobiles. Write us for prices on any parts you may require and save money over having them made up special.

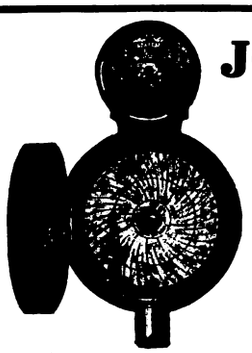
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Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

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JONES RECORDER

Gives time, speed and distance. Number of stops—length of each stop. Complete record of every movement or stop of vehicle marked on chart. Absolutely essential to all operators of motor trucks or delivery wagons.

The Jones Recorder consists of a strong brass casing, containing a clock work and flexible shaft from the drive wheel of the vehicle.

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PITTSFIELD

Improved Spark Coils
Waterproof and Almost Indestructible

The special method of winding and insulating the Pittsfield Coils makes every unit absolutely waterproof and almost indestructible.

For 1 to 6 cylinder engines, with or without kick-off switch. *Write for Catalog*

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"RAJAH" SPARK PLUGS

Ignition Absolutely Sure

RAJAH AUTO SUPPLY COMPANY
BLOOMFIELD, N. J.

Standard Universal Rims



fit any style or make of tires. The side rings are reversible, they curve outward on one side to fit a straight side tire, inward on the other to accommodate a clincher. Two turns of a nut unlocks the rim for demounting, two more turns locks the rim in place. Write for catalog 607, which explains fully.



THE UNITED RIM COMPANY, Akron, Ohio

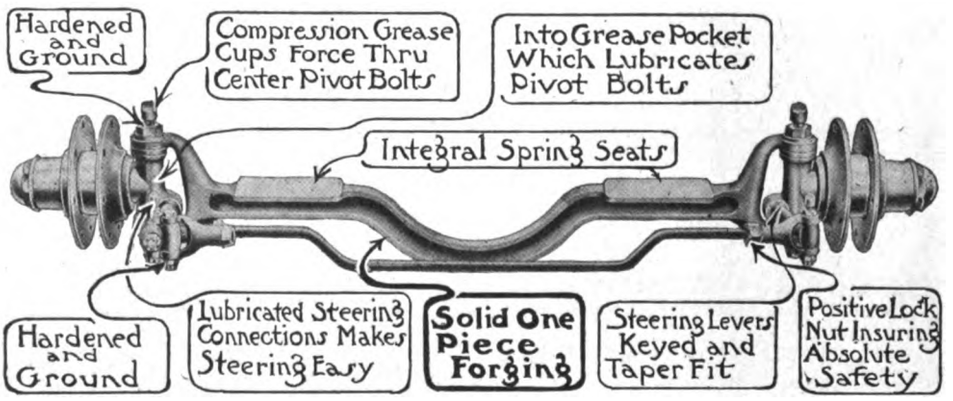
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EXPERIENCE — SHELDON — RIGHT DESIGN
FACILITIES — AXLES — RIGHT STEEL
"Made in the Largest Axle Factory in the World"

Axle Talk—No. VII



Consistent lubrication of the steering points on the front axle is imperative, for in the course of a hundred mile run, thousands of movements of greater or less degree occur. Frictional wear following poor lubrication would soon leave its mark—and the physical exertion incident to steering would be increased beyond reason.

Note the SHELDON system of lubrication. Here pivot bolts and steering connections are cared for by a compression system, insuring steady, even distribution of grease under all temperature and load conditions.

Study the SHELDON Axle construction details shown on this chart—each notated point represents something different and better—unusual features designed to conserve strength, safety and convenience.

The concentrated and harmoniously combined knowledge and experience of the largest force of trained engineers, chemists and skilled mechanics is at your service.

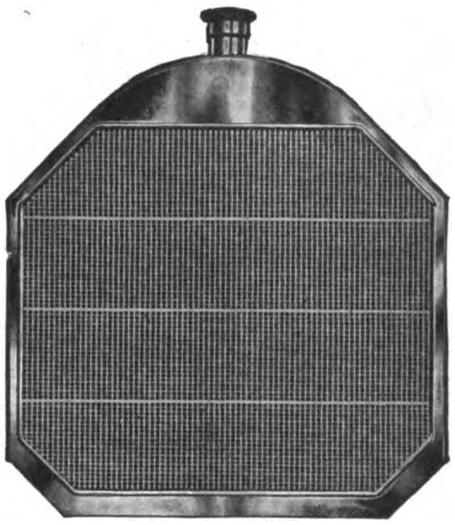
No matter how difficult your axle problems may be, we will help you solve them.

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE
68 East 12th St.

DETROIT OFFICE
1215 Woodward Ave.

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The Mayo - the radiator thoroughbred

¶Mayo, the radiator thoroughbred, that is worthy of embodiment on only the thoroughbred car.

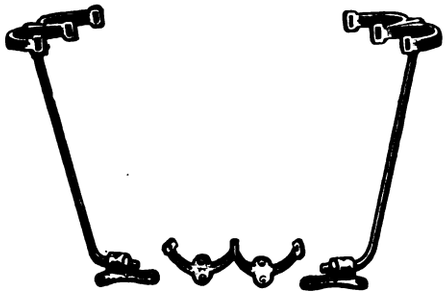
¶If you are to buy a new car be certain that it is equipped with the Mayo—that radiator which is made with every possible care to insure utmost efficiency.

Mayo Radiator Company
NEW HAVEN, CONNECTICUT

The Largest Automobile Supply House in America

FIFTEEN STORES IN THE UNITED STATES

"Torpedo" Tire and Demountable Rim Holders



Designed especially for use on Torpedo body or Fore-door cars Set consists of two strong arms firmly bolted to running board and permitting of sufficient adjustment to accommodate two tires or demountable rims, of standard sizes, 4 inch or smaller. Made of solid Brass and guaranteed to give perfect satisfaction.

Finish: Furnished in Hard Rubber Black Enamel finish, and full Polished Brass.

	Brass	Black
Price, complete with Straps...	$4.00	$3.00

A dozen other styles and sizes in stock. See catalog.

Our 1912 Catalog, which is held as a book of reference by manufacturers, dealers and automobile owners, will be mailed on request. Circulation limited to 100,000 copies.

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Studebaker

FLANDERS TWENTY

E-M-F THIRTY

How Will Your Car Be Built?

How your car will be built is too important a matter for you to take for granted. It is the crux of the whole question of what you get for your money. And there is today, as there always has been, a vital difference in the construction of different cars. Most cars are good enough, some are better and one or two are absolutely best.

What you really get for your money is determined back in the factories where your car is made. Don't forget that.

And today, just as in the past, The Studebaker Corporation has the largest, the best automobile factories in the world.

The Studebaker-Flanders "20," for example, is built from iron and steels made to our own specifications by Pittsburgh mills and every shipment we receive is chemically analyzed to maintain our standard. Our own mighty hammers drop-forge no less than 226 parts for every Studebaker-Flanders "20." Studebaker foundries cast Studebaker cylinders with a degree of accuracy not purchasable in the open market.

All our steel is heat treated and, where necessary, case-hardened in Studebaker ovens and by our own secret processes.

Through all the marvelous milling and grinding operations which transform the rough forging or casting into the finished piece, as delicately measured as a watch, accuracy is the keynote and at every point inspection is rigidly exact.

It is Studebaker manufacture by Studebaker processes, and the genius of it is quantity production by automatic machinery. The hand will make mistakes, the automatic machine, never.

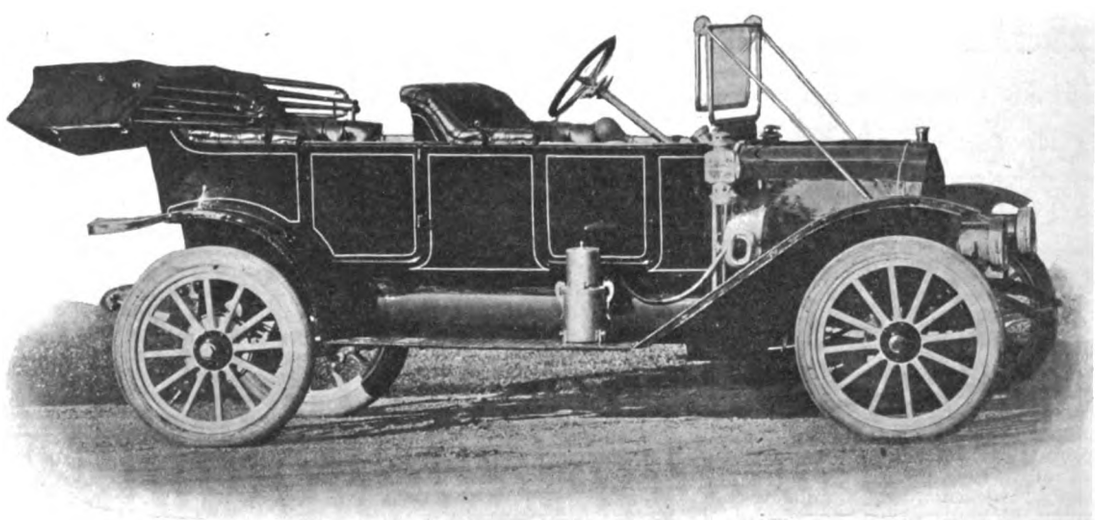
Studebaker cars are not assembled cars in any way. They are built, practically entire, in Studebaker factories. This means a great deal to an owner. How much, any experienced automobilist can tell you. We know, and you can be certain of, your Studebaker car.

If you are offered a car at less money than a Studebaker-Flanders "20," make a few comparisons. Consider the appearance, comfort, transmission design, spring suspension, rear axle and brake construction, sufficiency of bearings, steering gear, and other important features.

If some one urges on you a car at higher price, make the same comparisons, and weigh the fact that the Studebaker system of manufacture enables us to build better and cheaper than any maker with inferior facilities possibly can.

Studebaker cars are one price to all, with a fair profit to the dealer, because they are honestly built and honestly priced. And remember that the dealer must make a fair profit if he is to remain in business.

When you buy a Studebaker-E-M-F "30" or Studebaker-Flanders "20" you get a car built in the best factories in the industry by men whose name for years has been a byword for business honor. You couldn't ask more and you needn't get less.



Studebaker-Flanders "20" Touring Car, standard equipped.....$800, F. O. B. Detroit.
Equipped with Top, Windshield, Prest-O-Lite Tank and Speedometer, $885, F. O. B. Detroit.

STUDEBAKER MODELS

Studebaker-Flanders "20"		Studebaker-E-M-F "30"	
Touring Car	$800	Touring Car	$1100
Roadster	750	Detachable Demi-Tonneau	1100
Delivery Car	800	Roadster	1100
Utility Car	800		

Our new Art Catalogue B will Interest You. Send for it.

THE STUDEBAKER CORPORATION, Detroit, Mich.

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Eliminate Tire Trouble—How Many More Cars Could You Sell, Mr. Dealer?

If you can say truthfully to your prospective car buyers—"I can guarantee you three thousand more miles of tire wear with this car because it is equipped with wire wheels,"

Do you think it will help you to sell more cars?

70% MORE TIRE MILES WIRE McCUE WHEELS

That is just exactly what you can do if the car you handle is equipped with McCue wire wheels. There isn't one thing that the manufacturers of motor cars can do that will be as powerful a sales asset as the equipping of his cars with McCue wire wheels.

This is true, because

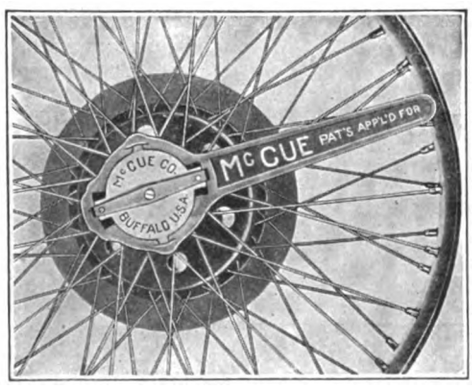
McCUE WIRE WHEELS will effect a saving of from 50 to 70 per cent. in tire wear.

McCUE WIRE WHEELS lengthen the life of your entire car by overcoming a great amount of the road shocks which wooden wheels transmit to the mechanism of the car itself.

McCUE WIRE WHEELS are stronger than wooden wheels.

McCUE WIRE WHEELS will make your car at least 200 pounds lighter.

McCue Axles are Dependable Axles



Applying Wire Wheels With Special Wrench.

Not alone are McCue axles dependable axles, but McCue axles are so made that either wire or wooden wheels may be used on the same spindle. This makes it easy for the manufacturer, at least, to list wire wheels as optional equipment. For the selection of either by the car buyer would entail no hardship or change of construction or design on the part of the car maker.

Get into the band wagon. Wire wheels are here to stay. They are no experiment. And McCue is a pioneer in wire wheel making.

The McCue Company

BUFFALO, NEW YORK

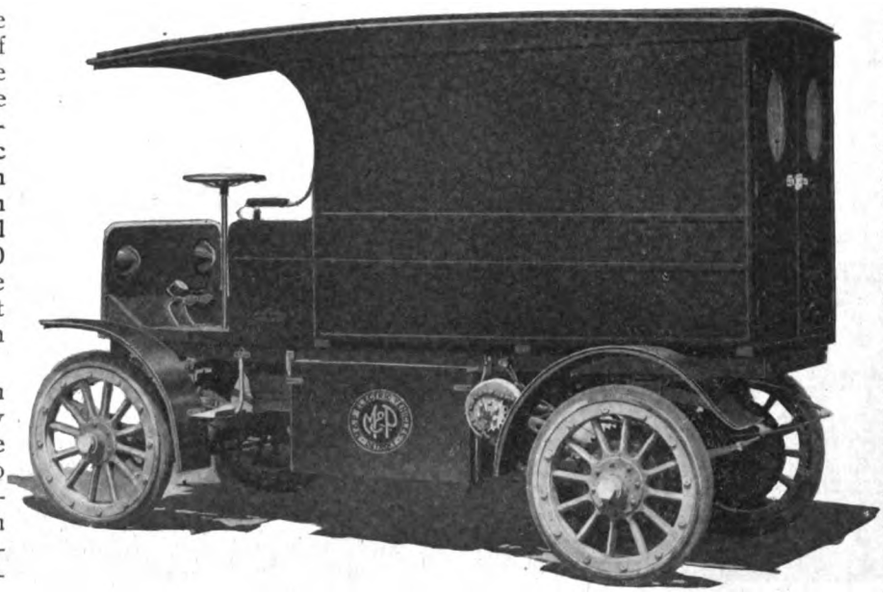
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One Thousand Pound ELECTRIC TRUCK

"Made to Make Good and does it"

THE final solution of the delivery problem lies largely with the electric truck, for reasons involving durability, economy of operation and ability to perform well under all circumstances.

We call the attention of progressive dealers to the **M & P 1000-pound electric truck which retails with closed or panel body for $1600** —a remarkable statement, but one true in every respect.



Merchants in your vicinity have heretofore been obliged to content themselves with cheap and inefficient gasoline delivery cars, ranging in price from $1000 to $1500. The cheapest electric truck of value has been $2200 a price entirely too high for the average mercantile concern.

The condition outlined in the foregoing paragraph has been responsible for the conception of the M & P truck, embodying quality in every particular, from tire to top—embracing every good feature and eliminating every weak feature found in other cars of the electric type.

The M & P is coming into popularity and it will be well for you to take up the matter of representing it before your territory is invaded. You will never have a better opportunity to sell a quality product at a popular price—**a product with a definite guarantee of service back of it.**

The M & P Electric Truck is one hundred per cent. more efficient and durable than a similar priced gasoline car. It is equal to, if not superior to, the higher priced electric truck in every detail.

These are facts that we, here in Detroit, are waiting to prove—to you.

Write and let us show you how you can make a liberal profit on the sale of the M & P—also how you can, at a very moderate price, install your own charging station which can be made a constant source of increasing income to you.

M & P Electric Vehicle Company

Franklin and Dubois Streets

DETROIT, MICHIGAN

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Tapered rollers, revolving about a cone, sustain more load because they carry it along lines—not on points as balls do.

A Timken Bearing with Cup Removed

As the parts are all tapered, any wear can be wholly taken up by adjustment—by advancing the cone into the cup.



Complete Bearing, Side View



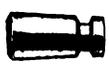
It requires six operations and six annealings to make this one-piece cage out of flat sheet-steel.

Cage that Holds Rollers in Place on Cone

Two ribs on the cone are *absolutely necessary* to maintain the full line-contact, by keeping the rollers from twisting.



Cone, Showing the Two Ribs



This roller receives as great care, accuracy and fine workmanship as any part of a watch.

Timken "Short Series" Roller

Motor Car Bearings Have to do Many Important Things

Keep friction down close to zero, of course.

Support all the load and stand all the shocks.

Meet "end-thrust" as well as vertical load

Put off the day of wear that must come.

And take up that wear by adjustment.

TIMKEN
TAPERED ROLLER BEARINGS

Under the tests of the most delicate friction-measuring instruments Timken Bearings show a co-efficient of friction so small as to be practically negligible.

Timken Bearings have greatest capacity for vertical load because they carry it along the entire length of their rollers, instead of on the points of balls.

They withstand side-pressure or "end-thrust" because their rollers are tapered and revolve at an angle to the shaft.

They show almost no wear—because the load is evenly distributed over a large enough area of contact.

And when wear does come—as it must come in any rotating parts ever made—that wear can be wholly taken up by adjustment, without the least sacrifice of the great Timken principles of efficiency.

Doing all these things means longest satisfactory service and lowest upkeep cost.

It is because the Timken Bearing does so perfectly all the different things good bearings must do that it is so widely adopted by American and Foreign motor-car builders.

You can get the whole story of axle and bearing importance and construction by writing to either address below for the Timken Primers, T-9 "On the Care and Character of Bearings," and T-10, "On the Anatomy of Automobile Axles."

For more than fourteen years the Timken Roller-Bearing Axle (made at Canton, Ohio) has been giving satisfactory service in horse-drawn vehicles

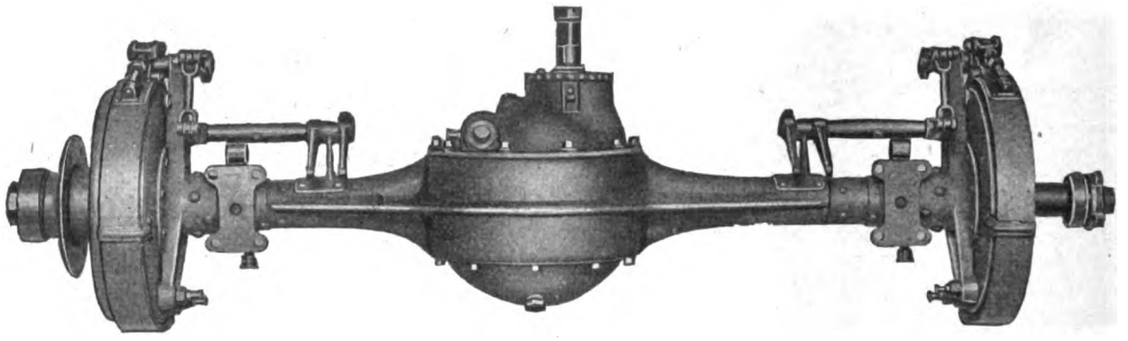
THE TIMKEN ROLLER BEARING COMPANY
Canton, Ohio
THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Mich.

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American American

Cars of Any Type Can Now Be Equipped With Either Bevel or Worm Gears on

American Axles



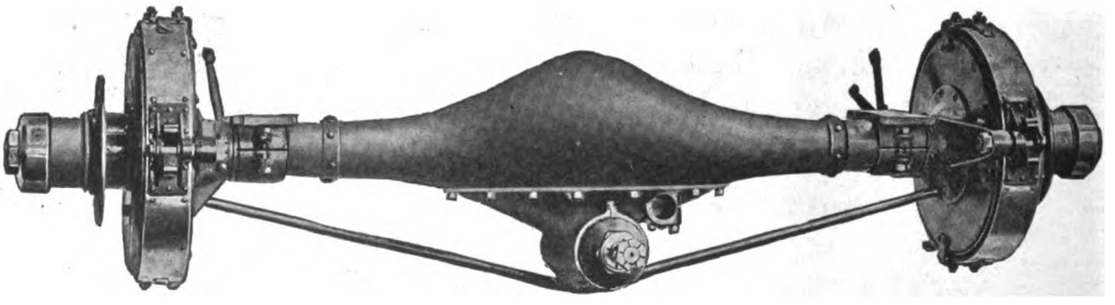
When we secured, through the Warner Gear Co., of Muncie, Ind., the sole American rights as axle manufacturers to the use of the Lanchester Worm Drive, *American* axle service was instantly extended to all classes of cars.

The Lanchester Worm Gear, with its years of English prestige, and the *American* Bevel Gear, holding equal rank in this country, are each available in an *American* Axle, with all that the name implies.

This immediately removes all doubt from the mind of the prospective car owner who wishes to employ a worm drive—who would gladly do so if he could be certain that in quality and design it would be the peer of the *American* Bevel Gear.

We settled that question for ourselves before we decided upon the Lanchester. We made sure beyond the question of a doubt that in its field it held precisely the same high rank that *American* Bevel Gears have always maintained in this country.

American Axles—either Bevel or Worm Drive are furnished for cars weighing up to 4,500 pounds and 60 H. P. They have annular ball bearings, with thrust bearings of ample size. Hubs may be equipped with either annular or taper roller bearings.



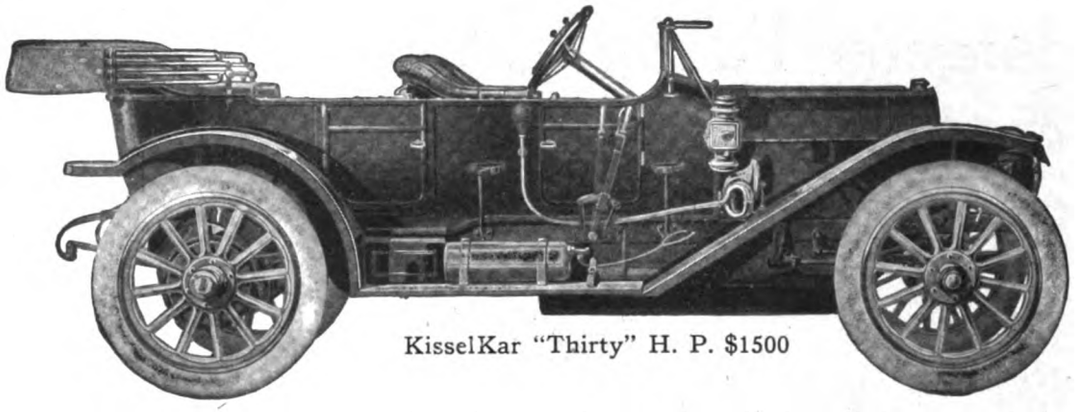
THE AMERICAN BALL-BEARING CO.

Edgewater Park and L. S. & M. S. Ry. CLEVELAND, OHIO

American

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No car can equal KisselKar comfort without equalling the wheel base



KisselKar "Thirty" H. P. $1500

EXTRA liberal wheel base permits the generously deep seats and unusually roomy tonneaus. These give an emphatically upper-class character and rare riding comfort to the KisselKar. With the liberal wheel base bridging the inequalities of the road, the big wheels, big tires, shock abers and deep seat upholstering absorbing road vibration, the KisselKar has an easy riding comfort which is approached by only a few American cars.

Light on its feet in picking the road, responsive of control, heavy enough to hold the road well, but light enough in proportion to its power to be lively and spirited, the KisselKar brings a special quality to the pleasure of automobiling.

And, as another special advantage that comes to the KisselKar owner, is KisselKar service. The KisselKar service organization, maintained by the manufacturer, with service centers at principal points in America, extends the completest service to every owner of a KisselKar, minimizing running cost, retarding depreciation, and adding to the fullest motoring enjoyment.

KISSELKAR

"Thirty" $1500 "Forty" $1850 "Fifty" $2350 60 H. P. "Six" $3000

Big line of commercial vehicles—1½ to 3, 4, 5 Ton Trucks, Delivery Wagons, Fire Department Apparatus, etc. **Write for catalog.**

Kissel Motor Car Co., 159 Kissel Ave., Hartford, Wis.

Boston New York Chicago Milwaukee Kansas City Los Angeles
Minneapolis St. Paul St. Louis Dallas

Philadelphia, Cleveland, Detroit, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, and 200 other principal points throughout America.

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A New Stewart Speedometer with Grade Indicator from the World's Greatest Speedometer Factories

No Finer Speedometer Ever Built



Model B $50
Model B-1 $85
(Clock Combination)

The world's greatest authorities on magnets and magnetism have approved of this new system. We will furnish to those interested reports of tests made by technological experts showing the marvelous accuracy of these instruments

FACTS AND FEATURES

This instrument operates on the magnetic principle. A perfectly balanced dial cup is positioned in jewel bearings in the field of a *permanent* magnet and is acted on by the Foucault or eddy currents from a permanent magnet when the latter is rotated. As is well known, this torque or pull on the cup is directly proportional to the speed at which the magnet is rotated. The indicating figures are cut directly on the dial. (*We are owners of the early patent on speedometer with rotating dial.*)

This New Instrument Differs from Other Magnetic Speedometers

First, and of vital importance, is the improved magnet—(*developed by Stewart engineers*) —the magnet in the form of a *closed ring.*



Every engineer and electrician will appreciate this real improvement. A continuous metallic path for the flux is thus assured that insures *absolute permanence.* A *keeper,* as it were, is *constantly* provided. In fact, the keeper is an *integral part* of the magnet itself.

This ideal form of magnet permits of entirely dispensing with the field plate, or field ring, heretofore used, thus greatly simplifying the mechanism and permitting greatlyincreased space in the case, thus accommodating a liberally proportioned temperature compensator.

This temperature compensator is an exceedingly simple arrangement of a bi-metallic coil that, responsive to temperature changes, actuates a quadrant arm carrying the spring. The action is direct and positive; having virtually no resistance to overcome, no load to lift or sustain, the action is dependable.

Temperature Compensators and Grade Indicators Are Exclusive Features of Stewart Speedometers

The grade indicator is an integral part of the instrument. The dial, actuated by a unique mechanism, indicates exactly the grade that the car may be ascending or descending at any time. A valuable feature, and one greatly appreciated by automobile factory engineers, who see in it great possibilities for a more rational use of speed change levers on their cars.

A New Odometer of the Highest Grade

Large size number wheels driven by a train of large, coarse-pitchod actuating gears, no springs. The simplest, highest cost and highest grade odometer ever used in this class of instrument.

The Equipment

Stewart Speedometers are fitted with the strongest flexible shaft. This we believe everybody concedes. We have been for more than 20 years the largest makers of flexible shafting in the world. The swivel joint, *first used on Stewart Speedometers,* and now widely copied, is another detail on which we spend more money than others.

Our swivel joint is made of hardened steel forgings (not castings), unbreakable, and will outlast the car to which it is attached.

The forged swivel joint is an exclusive feature of Stewart Speedometers. **We have spent during the past year over $100,000 providing buildings and machinery for producing *this one item* of speedometer equipment, that we might be enabled to make a high grade, unbreakable drop forged steel joint at a cost that would not prohibit using them even on our lower priced instruments.**

Clock Combinations

We point to improvements and features that can be purchased only in combination with Stewart Speedometers. We use a Seth Thomas clock, rim wind and rim set. Stop for a minute and think what this means. To wind it, you merely turn the rim of the clock—no key to hunt for; no taking off the bezel each time you wish to wind or set it. To set the clock, you merely pull out and turn the same rim—no unsightly knobs to destroy the beauty of the clock or openings in the case — sure to permit the entrance of water and dust—liable to put the clock out of commission.

Our experience with other makes of clocks used on speedometers has proven that Seth Thomas clocks are the best for the purpose.

Factories

Stewart Speedometers are made in the largest speedometer factories in the world. The buildings were designod and built for the purpose; they are of the highest grade construction, completely protected from fire by automatic sprinklers and other devices. The factories cover an entire city block an· have a total floor space o about four acres. Nearly 600 expert workmen, exclusive of a factory office force of 60, and a shipping room force of 50, are employed. We pay the highest wages and salaries. Machine equipment is the finest obtainable, the automatic screw machine department comprising over 60 machines. From the ponderous double acting presses, used for drawing up the case or shell, to the finest jewel lathes, every piece of machinery is the most suitable for the purpose that money will purchase.



Largest Speedometer Factory in the World

Service Stations

The Stewart & Clark Manufacturing Company operate a chain of service stations extending from Boston to San Francisco, as well as in London, Paris, Australia, Africa and New Zealand. Stewart Speedometers are not put on the car and ignored. They are guaranteed for five years, and with service stations all over the world, it is possible for car owners whose cars are equipped with Stewart Speedometers, to get unequaled service.

Product

It is the aim of the managment to make Stewart Speedometers the finest that money will produce.

The Choice of Most Car Manufacturers

The factory engineers of 108 automobile factories have investigated Stewart Speedometers and approved of them as standard or special equipment on their 1912 cars. Equipment contracts for 1913 cars are being placed with us in such numbers as to indicate that most cars using speedometers will be Stewart equipped, contracts won in competition with all other makers — won on the merit of the instrument.

The most accurate speedometer ever produced

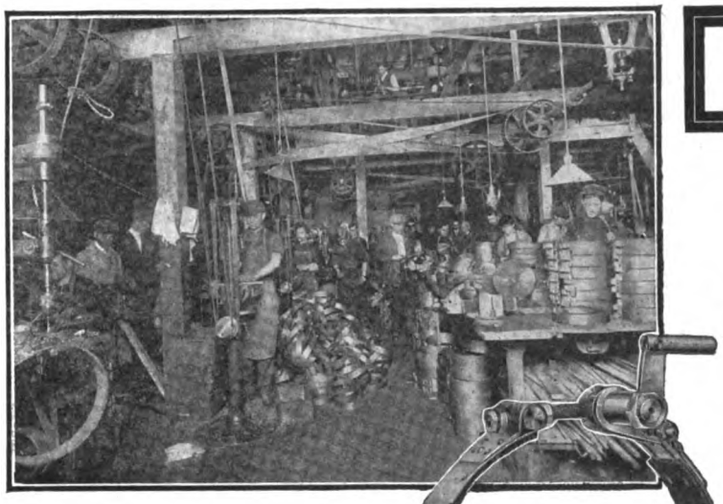
STEWART SPEEDOMETERS ARE GUARANTEED FOR FIVE YEARS ***Send for Catalogue***

STEWART & CLARK MANUFACTURING COMPANY
1928 Diversey Boulevard, Chicago

Detroit, Chicago, San Francisco, New York, Boston, Cleveland, Philadelphia, Kansas City, Los Angeles, Minneapolis, Indianapolis, London, Par i

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The Largest Brake Business In Our History



DUPLEX EXTERNAL BRAKES

The remarkable demand for DUPLEX and RAYMOND brakes has resulted in a phenomenal increase in our business. At present we are operating our entire plant at maximum capacity. We have also rented additional space and added new machinery in an effort to keep ahead of our orders. Every effort is being made to supply the demand for our products.

There's a Reason

Manufacturers, motorists and dealers have come to regard us as the foremost brake builders in the industry. Our designs have always led the field. Our workmanship and material is recognized as the best.



We not only supply DUPLEX and RAYMOND brakes complete, but we also manufacture large quantities of brake bands, lined, in accordance with special specifications. We recently received an order for 20,000 lined bands. Demonstrating the remarkable demand for our products. We are pre-eminently brake specialists. Our customers include the better manufacturers throughout the industry. Dealers and owners always look to us when having brake troubles.

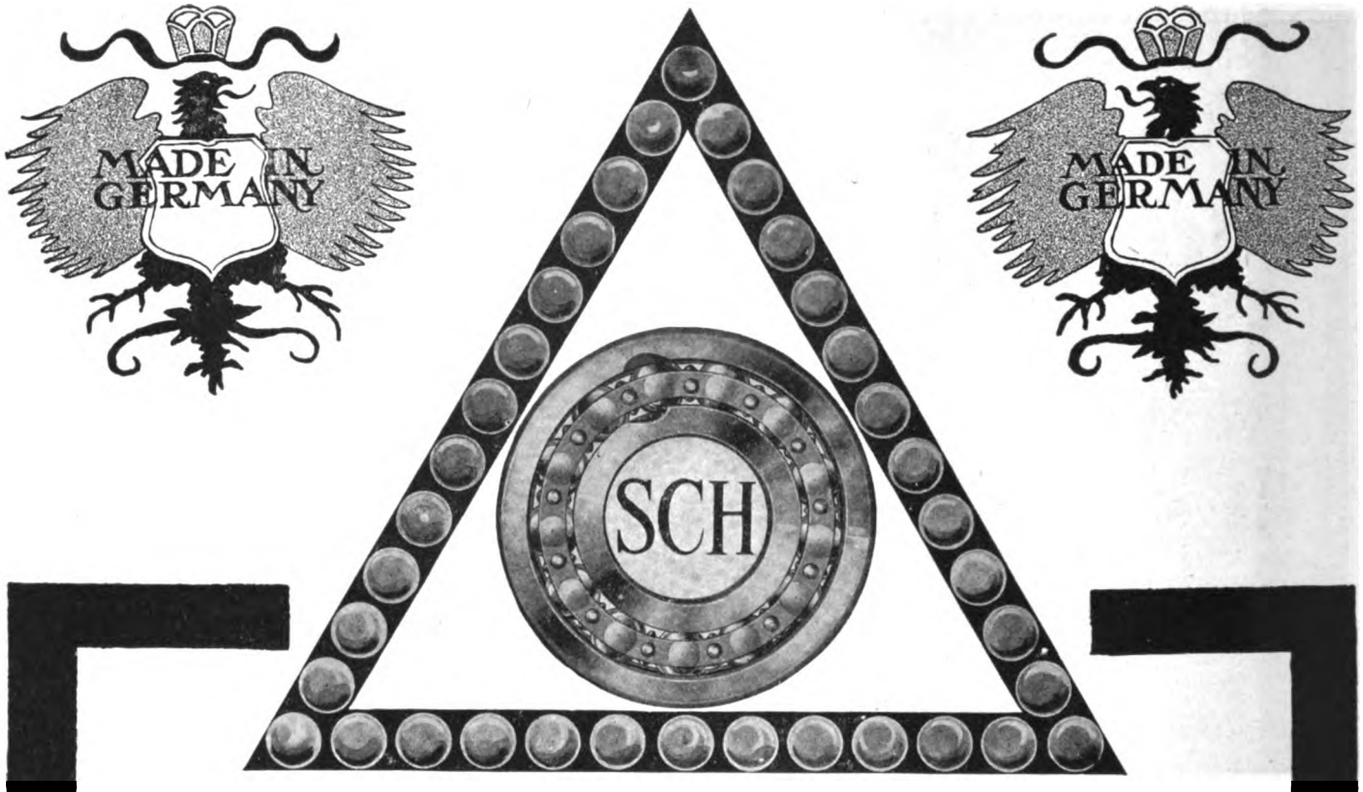
Our long years of experience, our service, our expert engineers and, above all, our excellent facilities have proven our right to be known as—

The Leading Brake Builders of America

Write for descriptive literature. Send your specifications—whether for one or one thousand brakes. We'll be glad to serve you. Also remember that we make RAYBESTOS Brake Lining and GYREX—the Mixer.

THE ROYAL EQUIPMENT COMPANY, 436 Housatonic Ave., Bridgeport, Conn.

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What Friction Means

FRICTION at the bearings indicates a dangerous defect at the most vital parts of your car. It is here that the weight rests—no part of your car can so quickly transmit friction to the entire mechanism as those parts which uphold the whole machine.

Ordinary ball bearings do not possess the requisite toughness and structural density to withstand the strains produced by the great moving weight which bears down on them. They crack and chip—the heavy car, moving over these irregular supports, induces a tremendous amount of friction, resulting in a constantly increasing quantity of undesired braking power. This makes more work for your engine. It lessens the flexibility of your car, destroys moving parts and shortens its useful life.

Schafer Ball Bearings are built to withstand the most extreme strains and stresses of hardest service. The durable, wear-resisting chrome steel used in their construction is of exclusive analysis, free from blisters, air bubbles and every intrinsic weakness that might cause the balls to vary in weight, size or structural strength. The balls are uniform to within .0001 part of an inch and remain so over long terms of hard service. Recognized by engineers as the highest grade and finest quality of anti-friction bearings made to-day.

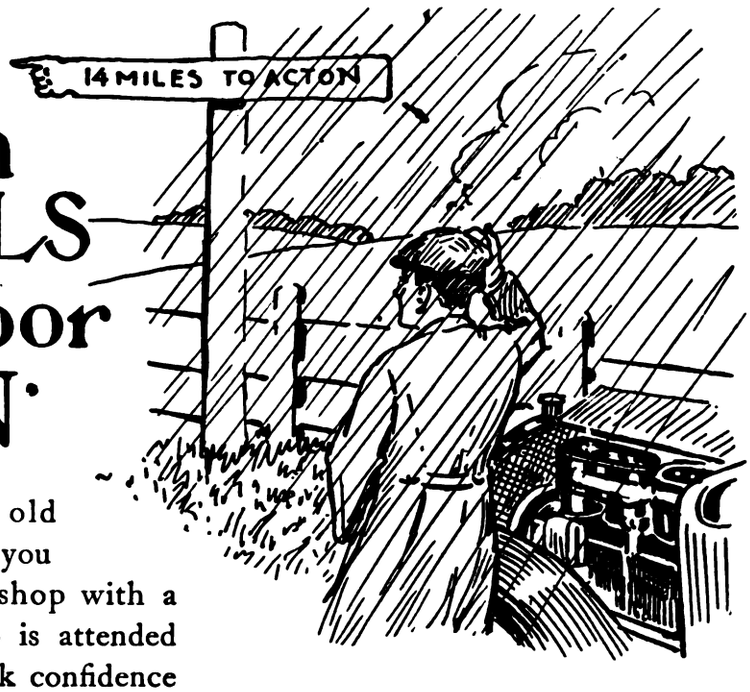
When you equip with Schafer you insure your car against frictional deterioration. Why not eliminate every element of weakness or inefficiency at the bearing points by employing Schafer Ball Bearings exclusively?

BARTHEL, DALY & MILLER

42 Broadway, New York City

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There's more than REPAIR BILLS against poor IGNITION



You never know when your old ignition will play out, leaving you stranded miles from a repair shop with a useless car. Every motor trip is attended with doubt and worry—you lack confidence in your equipment. Why not get the New Remy Magneto in place of your old ignition? You can get it for practically what your repairs now cost you, by taking advantage of the

REMY EXCHANGE PROPOSITION

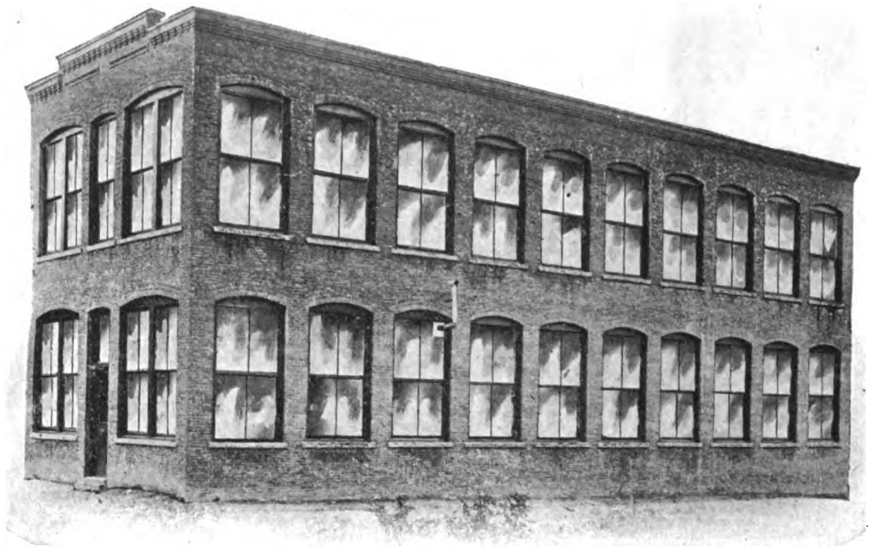
You will be free from all fear of ignition troubles and your car will be rejuvenated by having the latest type Remy, the product of the best brains engaged in ignition designing, backed by the world's greatest magneto factory.

Write, phone or call the nearest Remy Service Station for full particulars regarding our liberal exchange offer for ***your*** car.



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New Departnre Engineering Bnilding



METALLURGICAL LABORATORY : CHEMICAL LABORATORY
PHYSICAL LABORATORY : HEAT TREATING LABORATORY
ENGINEERING SERVICE DEPARTMENT

Every inch of the large floor space in this building is devoted to two supremely important purposes:

The perfection of New Departure ball bearings by progressive improvements in materials, manufacturing processes and general efficiency of the product.

A study of the practical problems and interests of users of anti-friction bearings, with a constant aim to assist in selecting just the ball bearing equipment that will give greatest efficiency at minimum cost of installation and maintenance.

We have secured an equipment for each department that is not excelled anywhere, particularly with reference to ball bearing manufacture and consultation service.

Our exceptional facilities are yours for the asking. In other words, the co-operation of our entire engineering department is at your command for the selection of the type and size of ball bearings adapted to your design and work. Write us today.

The New Departure Manufacturing Co.
BRISTOL, CONN.

Western Branch, 1016-17 Ford Bldg., Detroit, Mich.

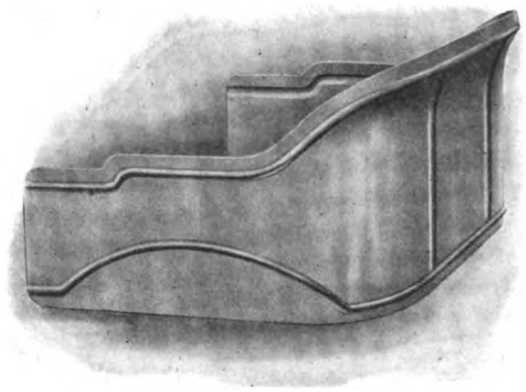
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MR. AUTOMOBILE MANUFACTURER

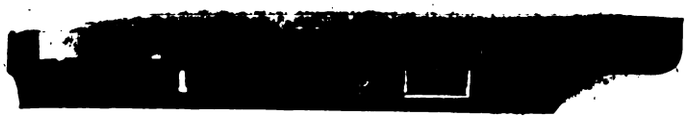
Ask Yourself This Question:

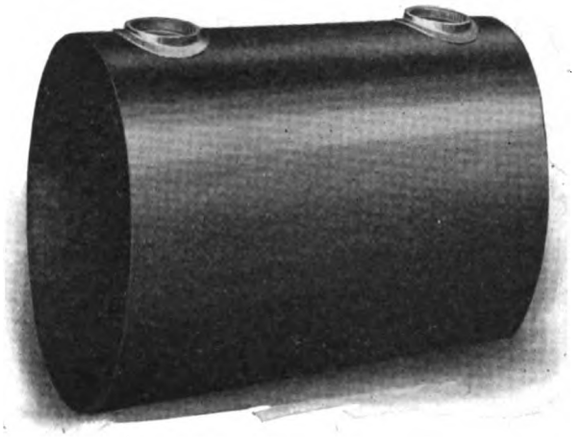
"How much do looks have to do with the sales of my car?"

Not a very big percentage of people who buy automobiles have the technical knowledge necessary to choose a car for its mechanical perfection; they must go largely upon say-so reputation, demonstration and **looks.**



In the matter of looks, why not safeguard your interests by building with Hayes sheet-metal parts—the handsomest in the market in construction, appearance and finish. **Especially** when, in doing so, you also back your car with Hayes quality and Hayes reputation, two factors that count big with those who are carwise and that insure the amateur purchaser a solid satisfaction which makes for your future success. The first automobile sheet-metal parts ever built were built by the Hayes organization, and the best ones built today are Hayes products.





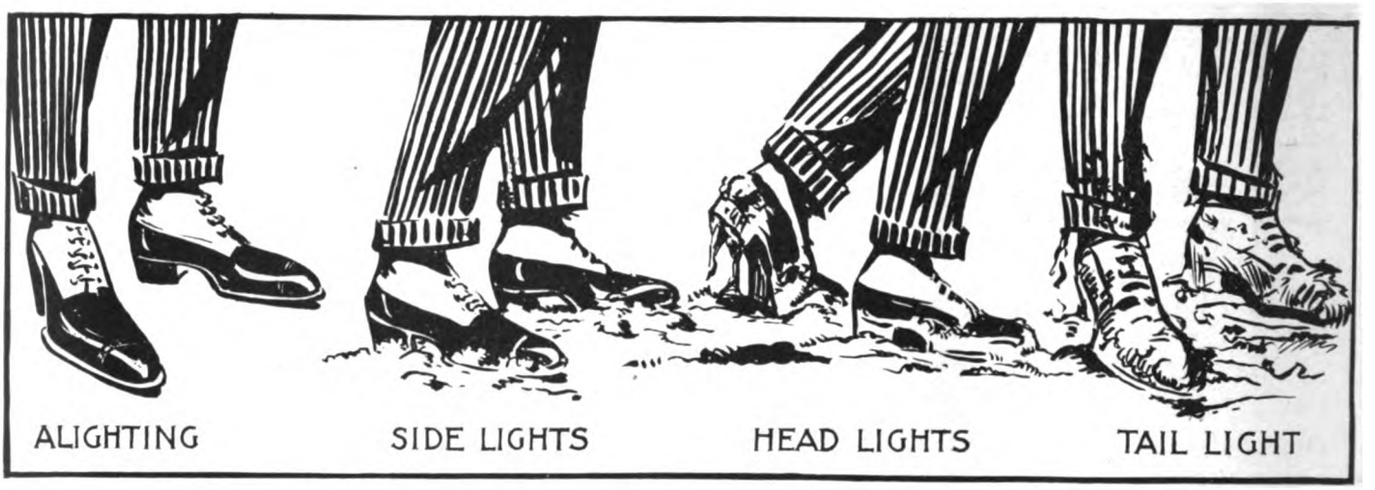
On the Mechanical Side

Our engineers are at your disposal. Send us your blue prints and let us make up for you a sample set of sheet-metal parts, complete from fenders to hood and body. Find out the satisfaction of Hayes products and Hayes Service. We will deliver in any stage of completion you say—enameled and fitted, or with only anti-rust baked on, and unassembled.

We are the largest users of sheet-metal in the world—can supply you everything in that line you want—bodies, fenders, tool and battery boxes, gasoline tanks, dashes, shrouds, hoods, running boards, shields, mufflers, etc.—AND WE DO IT CHEAPER THAN YOU CAN, because we have one of the best equipped plants in the country.

HAYES MANUFACTURING COMPANY, Detroit, Michigan

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KEEP YOUR "SHINE"
BY KEEPING OUT OF THE MUD

KEEP YOUR SEAT—PUSH A BUTTON
AND HAVE ELECTRIC LIGHTS

FROM AN

GLBA

(Class A)

ELECTRIC LIGHTING BATTERY

COMBINED WITH AN

ELECTRIC LIGHTING GENERATOR

Class A Batteries are for ELECTRIC LIGHTING
Class B Batteries are for ELECTRIC CRANKING and LIGHTING

Write us for full information.

WILLARD STORAGE BATTERY COMPANY

CLEVELAND, OHIO

NEW YORK BRANCH: 136 W. 52d Street **DETROIT BRANCH: 1191 Woodward Avenue** **CHICAGO BRANCH: 436 So. Dearborn Street**

Branches in All Principal Cities in the United States and Canada

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R-C-H

"Twenty-Five"

DEALERS who are considering the contract question for the coming season will do well to await the 1913 announcement of the R-C-H, which will appear next week.

It is universally admitted that the R-C-H set a new standard of motor-car value during the present year; and those who read our next announcement will admit with equal frankness that we have maintained our supremacy.

Our increased output will enable us to make arrangements with a number of additional dealers.

R-C-H Corporation 104 Lycaste Street **Detroit, Mich.**

Branches—ATLANTA, 548 Peachtree St.; BOSTON, 563 Boylston St.; BUFFALO, 1225 Main St.; CHICAGO, 2021 Michigan Ave.; CLEVELAND, 2122 Euclid Ave.; DENVER, 1520 Broadway; DETROIT, Woodward and Warren Aves.; KANSAS CITY, 3501 Main St.; LOS ANGELES, 1242 So. Flower St.; MINNEAPOLIS, 1206 Hennepin Ave.; NEW YORK, 1989 Broadway; PHILADELPHIA, 330 No. Broad St.; WALKERVILLE, ONT., CANADA.

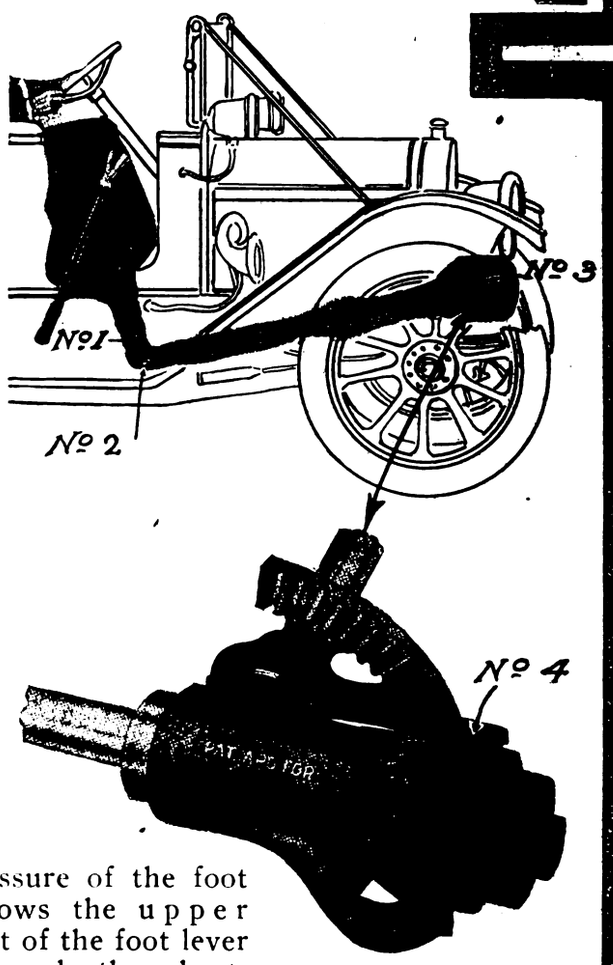
1913




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Many interested dealers write in and say: "Show us **How** it works"

All right — Here it is We would show more but theres nothing else to it. It's all before you



The NATIONAL STARTER

is a crank in the car operated by the foot and with less exertion than by cranking by hand; simply push the foot lever forward same as when using your brake or clutch and you spin your engine over once. Should your motor for any reason back-fire the NATIONAL will automatically throw itself out of gear, making injury from back-fire absolutely impossible.

Now, we refer to the detailed illustration of the starter mechanism.

No 1 shows the fulcrum or bearing point of the foot lever.

No. 2 shows the other end of the rod connected with the foot lever.

No. 3 shows the end view of the segment shaft and connections from same to the foot lever.

No. 4 shows the ratchet and pawl in disengaged position. It is operated by a quarter turn of the segment gear meshing in the bevel gear.

Here is the whole simple story. A slight pressure of the foot throws the upper part of the foot lever forward—the shorter, lower part backward, pulling the segment (connected with the long rod) which engages the shaft bevel gear to its limit of 72 degrees. This gives the engine one quick turn and then the foot lever immediately returns to its normal position ready for another start.

Now, Mr. Manufacturer and Dealer, this is the only one hundred per cent efficient starter in existence. Its first cost is its last cost. You cannot break or injure it. Once on the car it is good for all time.

If you are a manufacturer, write now for our quantity proposition — if you are a dealer, get in touch with us and learn of our liberal commissions on the many sales which you can readily make.

NATIONAL GAS ENGINE STARTER CO., 30-32 N. Dearborn St., Chicago, Ill.

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THE LONG HORN

YOU know mighty well that any warning signal that can never fail to sound its warning note, that costs nothing to operate, and that can be heard as far as any other signal, is the ideal automobile horn.

Then your customers must know the same thing.

That's why we insist that the Long Horn offers big money making opportunities for you.

Remember that the Long Horn is not an electric horn—it is the superior of any electric horn (when that electric horn is really working).

The Long Horn is a positive, mechanical, gear driven horn. Just push the button—and the horn sounds its warning note. It never can fail. When you push the button you set a train of gears in motion that whirl a fly-wheel containing roller bearings on its face, which in turn strike a diaphragm at a tremendous rate of speed.

Write for our dealers' proposition today. There's money in it for you.

No Wires to Break

No Friction Pulley to Slip

No Batteries to Give Out

No Motor To Go Back On You

Costs Nothing to Operate

IT NEVER FAILS TO WORK



$18

G·PIEL Company
13th Street & Boulevard
Long Island City, NY

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1913 AMERICAN UNDERSLUNG

NET SALES GAIN 211 PER CENT.
for last ten months over corresponding period of previous year.

The Most Modern Car

FOR the season of 1913 we announce our three famous standard models: the "American Traveler," at $4500; the "American Tourist," $2350; the "American Scout," $1475, *all fully equipped.*

No manufacturers of high grade motor cars in the country can boast the increased demands which have come in recent months to the makers of the "American Underslung." They are the accumulated sales of eight years of education on the part of the pioneer manufacturers of the most modern principle of all in automobiles. *The increase in sales of the "American Underslung" during the last ten months was 211 per cent. greater than in the corresponding months of a year ago.*

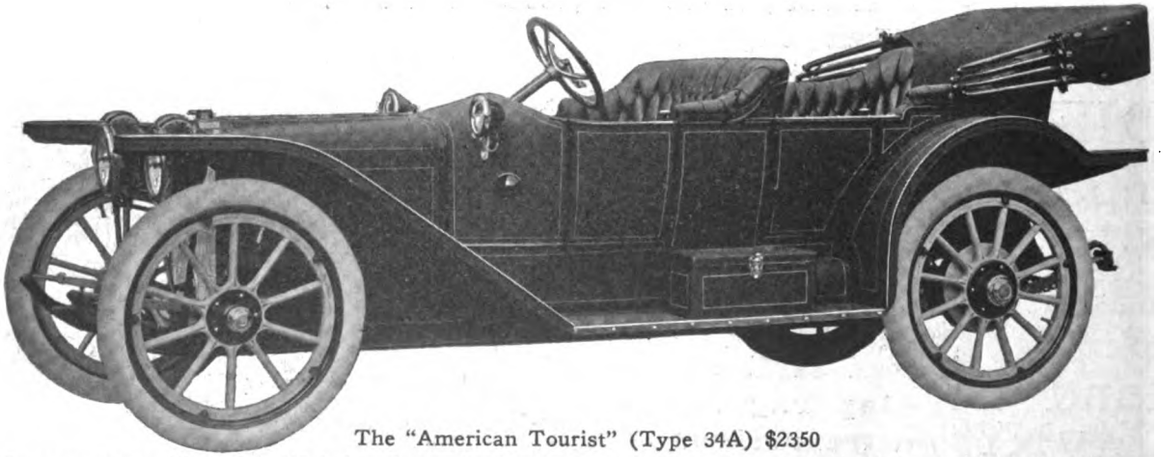
The superiority of the last word in motor car design is now not only conceded, but demanded by the habit-freed public. It was once looked upon as an experiment which should make good; now a car without it appears old style—antiquated. It is the safe, practical, graceful and stylish car the veteran motorist demands.

The "American Underslung" differs in constructive principle. The frame—the very backbone of the car—is slung under the axles instead of being placed over the axles, and the result is that the very drawbacks of the conventional overhead car are completely eliminated.

The low center of gravity means *safety* and added comfort.

American Motors Company

INDIANAPOLIS, INDIANA



The "American Tourist" (Type 34A) $2350

Four passengers. Wheel base 118 inch, tires, 37x4 inch; front and rear on Q. D. demountable rims.
$2350 includes regular equipment as follows: electric light dynamo outfit complete with generator and storage battery supplying five lamps; $50 Warner speedometer; fine plate glass wind shield; Disco self-starter; fine mohair top and curtains; high tension magneto and storage battery; one extra rim; shock absorber; robe rail; foot rest; horn; jack, tools and tire repair outfit.

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NOT SILENT—but "a noise so faint that one can scarce distinguish it from silence."

AMERICAN UNDERSLUNG 1913

Establishes Sales Record

The straight line drive means *less wasted power.*

The larger wheels mean easier riding, tire economy and *maximum road clearance.*

The underslung frame permits the *direct* and *practical* introduction of all these distinct advantages.

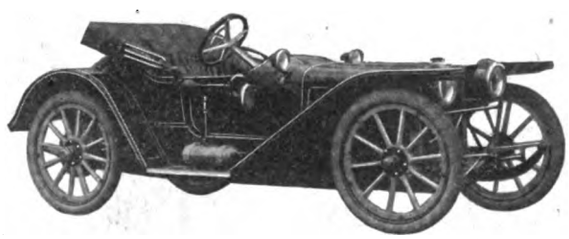
And on top of these guaranteed practical advantages, you have the most superbly and gracefully designed, and most handsomely finished car made. These big, strong, powerful cars are beauties. They are just as fine as we can make them. The exquisite body work is magnificent. Every "American Underslung" is as carefully made as a special job.

This year we have equipped the "American Underslung" with the finest accessories made. It is all in keeping with the elegance of the splendid new models. Nothing has been too good for us to secure and all is made regular equipment—not as extras. "American Underslungs" are known as fully equipped cars.

Our complete 1913 line can be seen in all of the principal cities. We began deliveries on Types 34A and 22A on June 17, and on Type 56A July 3.

Write us for a handsome 1913 catalogue and a simple treatise on the "Advantages of Underslung Construction."

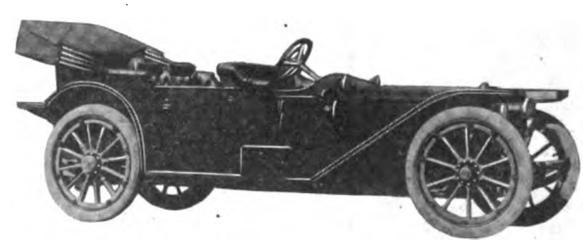
American Motors Company
INDIANAPOLIS, INDIANA



The "American Scout" (Type 22A) $1475

Strictly a 2-passenger car. Wheel base 105-inch; tires 36x3½ inch; front and rear on Q. D. demountable rims.

$1475 includes regular equipment as follows: $50 Warner speedometer; fine plate-glass wind shield; Disco self-starter; electric dash and tail lights supplied by a large storage battery; gas head lights supplied by Prest-o-light gas tank; fine mohair top and curtains, high tension magneto and storage battery with coil; one extra rim; combination circular tire holder and luggage box; horn, jack, tools and tire repair outfit.



The "American Traveler" (Type 56A) $4500

Six passengers. Wheel base 140 inches; tires, 41x4½-inch, front and rear on demountable rims. Springs—front, 40-inch; rear, 54-inch.

$4500 includes regular equipment as follows: combination electric lighting dynamo and self-starter, all five lamps electric; $90 Warner clock combination 100 mile speedometer; fine plate glass wind shield; fine mohair top and curtains; high tension magneto and storage battery; two extra rims; shock absorbers; foot rest; robe rail; horn, jack, tools and tire repair outfit.

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PREST-O-WELDER

Big Profits
For Every Garage

The Prest-O-Welder opens the way for a sure, sound, money-making, business-getting opportunity for every garage or machine shop.

This convenient, compact, portable welding outfit will repay you the initial cost and start making you money in a short time.

By its use you can weld broken parts and tools—steel, cast-iron, brass, bronze or aluminum at one-tenth the cost of new parts.

Don't let the opportunity go by. Don't let someone else be the first. Learn of our offer—how welding jobs called "impossible" are quickly and easily done. Ask today for—

The Prest-O-Welder Proposition

See how we back you up by our advertising service in getting business. Figure for yourself the big profits that this machine will bring you.

It costs just a postage stamp to learn the proposition. Don't let that stand between you and more money-making business.

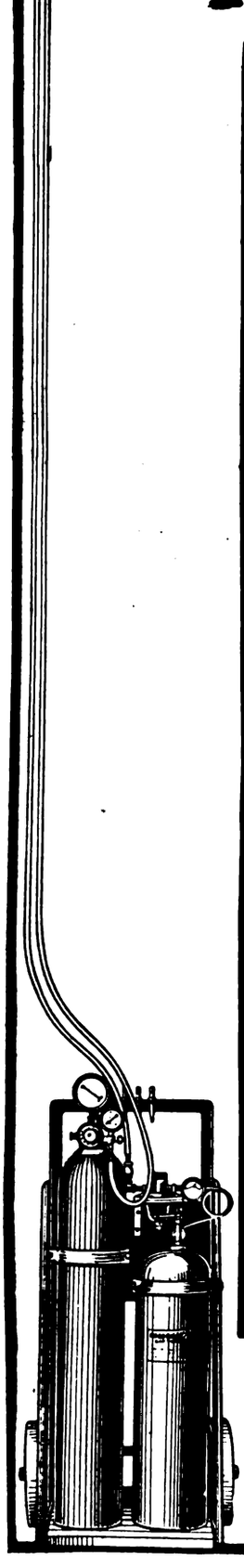
Write today.

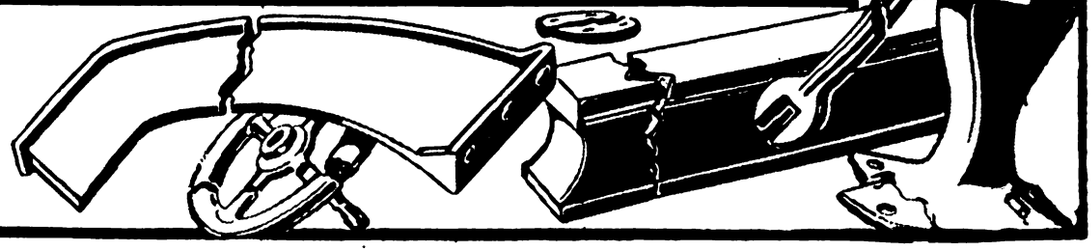
The Prest-O-Lite Co.

PREST-O-LITE
The Light Universal

Welding Dept., 287 W. South St.

Indianapolis, Indiana





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"The Horn that's Made for the Discriminating"

TUTO HORN

THE TWO TONE HORN

Unfailing Operation.

AS a rule a mechanism is not considered stronger than its weakest link.

¶ If this link breaks, the chain lets go.

¶ This principle was followed in the designing of the TUTO Horn. True, we gave more in signal value than ever before,—a low service note for everyday use and a loud commanding signal for emergencies—yet we reduced the chances for mechanical and electrical trouble to the minimum so as to insure unfailing operation.

¶ The possibilities of trouble in a warning device are a summation of every moving part and friction surface, such as gear wheels, bearings, ratchets, dogs, racks, ball bearings, brushes, commutators, connecting cords, push buttons and other operating mechanisms. The failure of any one of these elements puts the warning signal out of commission, and the device with the greatest number of these elements must be open to suspicion.

¶ In order to insure unfailing service, the most simple mechanism possible was utilized in the TUTO Horn. There is not a single bearing or friction surface, and as a consequence, there are less chances for trouble than in any other warning device made. There are very few moving parts to the TUTO Horn and these are so constructed as to operate constantly without breakage. Furthermore, complete protection is provided for the wiring which connects the horn, push button and battery, as the finest constructed electrical mechanism will fail to operate unless the circuit wires are intact. The TUTO Horn is the only electrical warning device which is furnished complete and with ample protection for the connnecting wires.

¶ The TUTO Horn is built to work from one season to another without any care or attention whatever. It is pronounced the best warning signal available, and has the stamp of approval of discriminating owners and the leading car makers.



TUTO Horn, $25.00

The Dean Electric Co.

260 Taylor Avenue, Elyria, Ohio

"Look for Dean where Quality's seen"



TUTO-ETTE $17.50

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Overland

WE want every prospective purchaser of an automobile to know that the Overland Model 60 costs $1200.

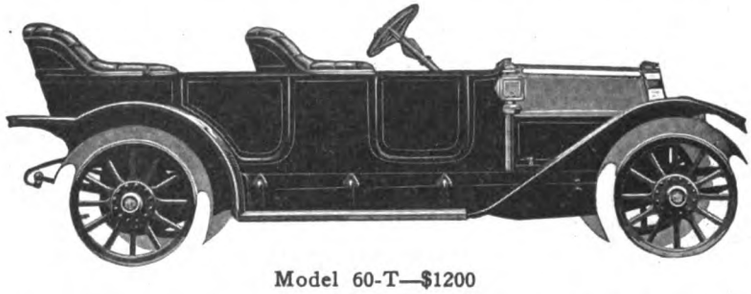
To sell you a Model 60 we want you to know the price first. We do not base our arguments on worthless special selling points in the manner of some manufacturers. Others will tell you of a thousand special features first of all. You may even have to ask the price.

You can get more automobile satisfaction for $1200 in an Overland Model 60 than for $1500 in any other line. That is why, when you come to inspect this car, we tell you the price first. Its merit is then self-evident.

The Overland Model 60 will never be equaled in low price until there is a duplication of the mammoth Willys-Overland production methods.

Ask for book I-46.

The Willys-Overland Company, Toledo, Ohio



Model 60-T—$1200

Wheel base, 111 inches; body, 5-passenger fore-door touring; motor 4⅛ x 4½; horsepower, 35; Remy magneto; tires, 34 x 4 inch Q. D.; equipment, three oil lamps in black and brass finish, two gas lamps, horn and generator. Self-Starter, $20 extra.

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THE MOTOR WORLD

Vol. XXXI New York, U. S. A., Thursday, June 20, 1912. No. 13

PACKARD PARES PRICES SLIGHTLY

Reductions Range from $350 to $600—Despite Reports to Contrary, Production of "Fours" Will be Continued.

Reports which have been circulating for all of two months, to the effect that the Packard Motor Car Co., of Detroit, proposed abandoning the manufacture of four-cylinder cars and doing something more or less alarming in the way of reducing prices on its 48-horsepower six-cylinder model, finally have been set at rest. Both of the Packard "fours," the 18 and the 30, will be continued as heretofore, and while the price of Packard "sixes" has been reduced, the reductions are not such as to give rise to alarm of any sort. The new lists and the old ones are as follows:

	1912	1913
Runabout	$5,000	$4,650
Touring car with top	5,250	4,850
Phaeton with top	5,215	4,850
Limousine	6,250	5,850
Landaulet	6.350	5,950
Imperial limousine	6,450	6,050
Brougham (fully enclosed)	6,300	5,800
Coupe	5,700	5,100

Whether the Packard reductions will similarly affect the prices of other cars of similar grade is a matter of speculation. It is known, however, that the Pierce-Arrow Motor Car Co. will maintain its former lists, both on its 48 and 66 horsepower "sixes," but that on the Pierce-Arrow 36 the prices will be slightly rearranged; $300 will be added to the prices of the runabout, touring car and brougham, the new lists being $4,300 for the runabout and touring car and $5,200 for the brougham.

Vanguard to Quit Joliet for Detroit.

The Vanguard Mfg. Co., of Joliet, Ill., of which C. F. Jansen is president, has decided to remove from that city and take up residence in Detroit, where it has acquired a site at Grand Trunk and Conant Road Junction. Work will be commenced at once on the erection of a plant which will comprise two buildings, 200 x 90 feet and 300 x 100 feet, respectively, which it is expected will be completed about September 1st and permit increased production of Vanguard windshields and accessories.

Sparks-Withington Reaches into Canada.

To better care for its trade in the Dominion, the Sparks-Withington Co., of Jackson, Mich., has established a branch in Walkerville, Ont., where its one-piece blade radiator fan will be produced in quantities. The fan is fully protected by Canadian patents, which fact will serve to strengthen the Sparks-Withington position on the other side of the border.

Bowen to Revive the Penn Unit Car.

James K. Bowen, of Allentown, Pa., former head of the bankrupt Penn Unit Mfg. Co., of that city, has practically completed the organization of a new $500,000 company of the same name to acquire the assets and continue the production of Penn Unit cars. Bowen is a man of ample means and has the work of organization well in hand.

Nyberg to Assemble in San Francisco.

The Nyberg Automobile Works, of Anderson, Ind., which recently established an assembling plant in Chattanooga, Tenn., has still more ambitious plans of the same nature. Among other things, it is making ready to locate an assembling plant in San Francisco, which will take care of its entire trade on the Pacific Coast.

Amplex Incorporates for a Million.

Reorganization of the Simplex Motor Car Co., of Mishawaka, Ind., has advanced to the point of the incorporation under Delaware laws of a new company styled the Amplex Motor Car Co. It is capitalized at $1,000,000, but officers have not been elected or other details completed.

Enlarging Capacity for Ohio Electrics.

The Ohio Electric Car Co., of Toledo, O., has secured the necessary permit for the erection of a three story addition to its factory in that city. The building will be 100 x 61 feet and will cost $15,000.

TWO STEWART TRUCKS REPLACE ONE

Lippard-Stewart Principals Agree to Disagree and Two Companies Result—Aggressiveness to Characterize Both.

Because of differences that could not be reconciled, T. R. Lippard and R. G. Stewart, the organizers of the Lippard-Stewart Motor Car Co., of Buffalo, N. Y., have resigned from that organization and formed the Stewart Motor Corporation, of which Lippard has become president and general manager and Stewart vice-president and chief engineer. R. H. Lentz is secretary and treasurer, and Robert W. Ingersoll, former sales manager of the Lippard-Stewart company, occupies the same post in the Stewart corporation, which is capitalized at $250,000. For the time being, its offices are located at 1056 Ellicott Square Building.

With the retirement of Lippard and Stewart, the Lippard-Stewart Motor Car Co., which will continue to operate the factory on Elmwood avenue, in Buffalo, has elected new officers, as follows: August Becker, president; E. J. Barcalo, treasurer, and J. C. Millar, secretary. Charles H. Dalquist, former assistant chief engineer, has been promoted to the post of chief engineer, and W. F. Reynolds has been appointed sales manager.

The turn of affairs leaves Messrs. Becker and Barcalo in full control of the Lippard-Stewart plant and affairs, and it is their purpose to do things on such a greatly enlarged scale as to make their factory one of the largest producers of light trucks in this country.

The new Stewart corporation will also produce light trucks, of 1,500 lbs. and one-ton capacity, constructed along the lines of the one with which they previously were identified. They are now engaged in the purchase of factory equipment and material for their new plant, which probably will be acquired before the end of the present week.

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EVERITT EXPLAINS ITS ATTITUDE

Recent Happenings To Be Followed by No Momentous Changes—Meaning of "Flanders Group" is Defined.

Anticipations that, following the removal of what is termed the "Flanders group" to the Metzger Motor Car Co., of Detroit —which now is being styled the Everitt Motor Car Co., although no such change of name is yet a matter of public record—there immediately would be "big doings," are likely to prove vain. Every effort is now being made to assure Everitt agents that no radical changes will be made and that, to quote an official statement, the "advent of the Flanders group simply means that the Everitt capital has been increased from $1,000,000 to $3,000,000," which, it is naively added, "means three times the factory capacity and three times the output." While the "big things" that were in contemplation have not been abandoned, and negotiations which may result in a merger still are in progress, the Everitt people emphatically deny that their present models, 30 and 36, will be replaced by new models. To quote the official utterance, "there will be no new models, nor will even the slightest changes be made either in mechanical features, prices or any other way."

Simms's Formal Reorganization Deferred.

Contrary to first statements, the readjustment of the affairs of the Simms Magneto Co., of Bloomfield, N. J., which was scheduled for completion at the stockholders' meeting which was held on Thursday last, 13th inst., did not take place. The gathering was informal, and as described by one of the officials of the Assets Realization Co. who also is connected with the Simms company, was simply a "get together" meeting at which no business of an important nature was transacted. Notices calling for a formal meeting of the stockholders have not yet been sent out, and as they are required to be despatched at least 20 days prior to the date of the meeting, it will be several weeks at least before the organization finally is perfected.

Weiland Fails to Defend Weed Action.

Judgment by default was entered in the United States District Court for the Southern District of New York in favor of the Weed Chain Tire Grip Co. against Charles Weiland, of New York, for infringement of the Parsons-Weed patent, No. 723,299. The case was carried through with remarkable despatch. It was filed on June 11th and argued on the 15th, and as Weiland entered no defense the preliminary injunction prayed for was promptly granted. Weiland and also the 35% Automobile Supply Company are, however, involved in another suit in the same court, instituted by the Weed company, involving its tire chain adjuster patent, No. 953,673, which was argued on Friday last, 14th inst, and which the court now has under advisement.

Oppose Neale's Wife's Bankruptcy Petition.

Mary N. Neale has filed a petition in bankruptcy against the Cincinnati Taxicab Co., of Cincinnati, O., but Joseph Austin, as administrator of the estate of Emma Austin, a judgment creditor for $2,500, has entered legal objection. Austin points out that Mrs. Neale is the wife of Charles C. Neale, president of the taxicab company, and although she poses as a holder of promissory notes to the amount of $14,659, Austin alleges that the notes and the execution of chattel mortgages are a pretense to enable her husband to appropriate the property of the company against the interests of the creditors.

May Make Cylinder Castings in Columbus.

Negotiations are pending whereby the buildings in Columbus, Ind., once occupied by the defunct Janney Mfg. Co., will be turned over by their owner, George W. Caldwell, to a new company which will be styled the Caldwell Auto Parts Co., which will devote itself chiefly to the production of cylinder castings. J. I. Hanley, president of the American Motors Co., of Indianapolis, S. H. Penfield and Benjamin S. Dean, of the Salisbury Wheel & Mfg. Co., of Jamestown, N. Y., and Fletcher Goodwill, of Detroit, are parties to the transaction.

Wyckoff Sued as Note Endorser.

An aftermath of the bankruptcy of Wyckoff, Church & Partridge is discernable in a judgment filed this week against Clarence F. Wyckoff by M. M. Levy, a furrier, for $367.41, the amount of and interest on a note given by the company for goods delivered to it, consisting of fur caps and other articles. Wyckoff was the endorser of the note, and the suit resulting in the judgment was completed some time since, but the judgment was filed only when its payment was delayed.

Bijur Lighting System Ready for Market.

After having been quietly developed and perfected, the Bijur electric lighting system is about to be formally placed on the market by its makers, the Bijur Motor Lighting Co., at 250 West 54th street, New York City. That the system is "worth while" is indicated by its adoption as regular equipment by the Packard Motor Car Co. It is of the dynamo and storage battery type and is distinguished by an original form of governor.

Hudson to Add New "Four," Also.

In addition to a six-cylinder model, the Hudson Motor Car Co., of Detroit, will also add a new "four" to its line. It will be styled the Hudson "37" and will list at $1875, which price will include the Delco electric lighting and starting system, among other things.

CREDITORS FAVOR BIG CORPORATION

Banks Grant Extension and Assume Financial Direction of U. S. Motor—Other Creditors Also Relieve Pressure.

Plain to those who were aware of conditions that have existed, the meaning of the recent violent downward movement in the value of the United States Motor Co.'s shares, early this week was made clear to all when the banks which held the big corporation's maturing paper for large amounts, granted a 90-day extension and organized an advisory committee to take charge of the company's finances. To facilitate the work, a representative of the banking interests, W. E. Strong, of the Bankers Trust Co., of New York, was later elected a director and chairman of the United States Motor Co.'s executive committee, the members of the advisory committee being as follows: George W. Davison of the Central Trust Co.; Benjamin Strong, Jr., first vice-president of the Bankers Trust Co.; A. H. Wiggin, president of the Chase National Bank; Neal Rantoul, Anthony N. Brady, Elisha S. Williams, president of the Rubber Goods Manufacturing Co.; and Charles E. Sabin of the Guaranty Trust Co.

On Monday, after the banks had taken action, some fifty of the principal merchandise creditors also held a meeting and similarly agreed to a 90-day extension.

It has been common property for many months that the United States Motor Co. has been sailing close to the wind, its operations being hampered not by lack of business but by lack of sufficient capital to swing the great volume of its transactions. The price of its shares has ruled low, and the violent break during the past two weeks indicated that matters were approaching a crisis. The officers of the company, of course, were well aware of the situation and plans for reorganization and refinancing were well in hand and proceeding satisfactorily when, with a large amount of its paper about to become due, the insistence of certain creditors rendered necessary the application for the extensions.

During the past two months the company has reduced its total bills, accounts and notes from $7,000,000 to, approximately, $3,000,000, more than $1,000,000 having been paid out during the month of May, but despite these large payments the threatening action of a few creditors served to embarrass the management of the company and to defeat its efforts to complete refinancing before a crisis.

Just what the plans comprise has not yet been made known, but it is stated that it is not unlikely that the capitalization will be reduced and the shares placed on a wholly different basis, and that further consolidation of plants and weeding out of conflicting models will be pushed.

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PARTNERS SQUABBLE OVER PROFITS

Uncomplimentary Terms Fly about Napier Agency in New York City—Glentworth Repudiates Jackson as a Partner.

Whether Clarence A. Glentworth of 103 West 57th street, New York City, owes anything to Cornelius F. Jackson as profits on a partnership of the two in Glentworth's business of importing Napier cars is the gist of a case now nearing trial in Supreme Court for New York county and which is responsible for a bulky stack of documents on file wherein Glentworth and Jackson discuss each other's merits as salesmen and say numerous things which in tone might find an equal in a boyish quarrel. Glentworth claims Jackson, after some five and one-half months as a partner, withdrew his capital and quit, but Jackson says "that if the plaintiff withdrew it would not have been necessary for Glentworth to place a notice on the desk of the plaintiff in the handwriting of the defendant, as follows":

> Mr. Jackson:—
> Please do not open the mail any more.
> C. A. Glentworth.

That Glentworth forbid Jackson to open the firm's mail seems to rankle in the mind of the complainant, and several references are made to it. A peculiar incident is that, pending the decision of the matter, Glentworth, by an order of the court, is acting as receiver for what might be termed his own business.

Jackson claims he entered into partnership with Glentworth November 1, 1910, and at various times put into it something like $4,700; but admits that he has since received back about all of this amount. His claim is for $3,300 profits, of which he claims to have knowledge, and also for an accounting as to other profits and a dissolution of the partnership. He speaks disparagingly of Glentworth's assets, and asked that a receiver be appointed pending the decision of the case. Glentworth's appointment was the result of the argument. Jackson makes affidavit that he believes all Glentworth wanted was to get the Jackson money into the firm, place the business on a substantial foundation and then get Jackson out.

Glentworth retaliates by saying that before entering the partnership Jackson sold paint and worked in a broker's office and never sold a car while he was in the partnership. Glentworth states that he paid Jackson what was coming to him, and that the latter moved out and has not been seen since by the Napier agent. "His efficiency as a salesman," he said, "may be judged from the fact that he has never made a sale of an automobile since the firm was founded, nor has he introduced or procured a customer to whom a sale was made."

In answer to this Jackson tells what he thinks of Glentworth's selling ability, and says, "and in one instance the deponent made a sale where the defendant failed to do so, owing to his inability to make the sale, the deponent having interceded and consummated the sale." Glentworth states he has been Napier agent in Boston and New York for some time, but Jackson states he has "doots" on the subject. Meantime Glentworth occupies the office at the Napier agency and waits.

Parish-Orson Frame Suit Compromised.

Before it came to trial last week in the Supreme Court for New York County, the suit of the Parish Mfg. Co., of Reading, Pa. against the near-famous Orson Automobile Co., of New York, was amicably settled. The Parish company, it is understood, accepted $500, which represents the sum which it actually had expended for materials and labor on the contract for 100 Orson frames, only one of which was accepted by the Orson interests. Because of the breach of contract, the Pennsylvania corporation had sued for $501.11 for material and labor and $1,000 for lost profits, the Orson company setting up a counterclaim of $2,000 for alleged non-delivery of frames when they were wanted.

Claims Control of Two-Spring Carburetters

Suit has been filed by the Stromberg Motor Devices Co., of Chicago, in the Federal court in that city, against Leonard A. Parker, also of Chicago, for alleged infringement of patent No. 731,218, issued in 1903 to Oscar B. Perkins, of Gloucester, Mass. The patent, which is owned by the Stromberg company, is claimed to control the two-spring adjustment of carburetter valves, the first claim of the patent being as follows: "A vaporizer, comprising a shell having air and oil supplies and a valve coacting therewith, two springs, and means for bringing one or both of said springs into action to resist the opening of the valve."

Mosler Sues Price-Cutting Bloomingdales.

Bloomingdale Bros., proprietors of a large east side department store in New York City, have been sued in the United States District Court in New York by A. R. Mosler & Co. for infringement of the Mosler patents covering the Spit-Fire plug, Nos. 698,042 and 738,831. The alleged infringement consists of the sale of Spit-Fire plugs at less than the price fixed by the Mosler licenses.

Baldwin Establishes Branch in New York.

The Baldwin Chain & Mfg. Co., of Worcester, Mass., has established a branch in New York City at 416 Broadway. It is in charge of Charles D. Schmidt, and will carry an ample stock of Baldwin chains and sprockets.

FISHBACK PRODUCES THE FIGURES

Has Delaware Charter and Site in Iowa and Points Road to Riches—Recommendation in Capital Type.

After having raised high hopes in a number of other communities, the Fishback Motor Co., which several months since secured a "broad and liberal charter" under the broad and liberal laws of Delaware, has acquired a "very desirable tract of land" of about 15 acres in Waterloo, Ia., which tract has "ample surrounding acreage which may be secured for further extensions."

The Fishback Motor Co., which is capitalized at the modest sum of $3,000,000, has set no date for the erection of its factory, or the beginning of its operations on the "desirable tract." At the present moment, it appears to be chiefly engaged in disposing of $1,000,000 worth of its 7 per cent. preferred stock, which stock, of course, has a par value of $100 per share. Early birds, however, can purchase it for $90, and for good measure they will be given a 100 per cent. bonus of "fully paid, non-assessable common stock." The 7 per cent. will be "payable out of the first net profits of the company and insures for the preferred stockholders a dividend representing 8 per cent. on the actual amount invested," which is, however, not all the preferred stockholders may obtain; for it "also enables them to participate in the large prospective profits which will be applicable to dividends on the common stock."

R. Wilton Fishback, who once was vice-president and general manager of a Detroit company which manufactured marine and stationary motors, is president of the Fishback company, and if not its patron saint, he is hand in glove with him.

The unbuilt plant in Waterloo, Ia., may have an initial capacity of 10,000 cars per year, but as the demand for light commercial vehicles increases the "output doubtless will greatly exceed this quantity."

The company's immediate hopes are builded on a "conservatively estimated average output of 6,000 cars per annum during the first three years of its existence," but apparently believing that its presentation of a resume of the profits earned, or alleged to have been earned, by some of the well known and well established automobile manufacturers are not sufficiently tempting to investors, the Fishback promoters have improved on the ways of others by presenting in black and white a statement which is of uncommon interest as showing how it is possible to figure handsome profits before even a factory has been built or a wheel turned, the profits being of a nature that will cause not a few of those who actually are operating automobile factories to bite their lips for

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chagrin and disappointment and hide their diminished heads. Here is the way the Fishback experts figure it out:

Gross Earnings.

	Sales.	Per Car.	Total Receipts.
Runabouts	3,000	$700	$2,100,000
Touring Cars	2,200	850	1,870,000
Delivery Cars	800	750	600,000
Aggregate Total			$4,570,000
Less Dealers' Commission of 20% on Total Sales			914,000
Total Net Receipts			$3,656,000

Producing and Operating Expenses.

Including manufacturing cost, administration, advertising, taxes, insurance, ordinary repairs and maintenance, current experimentation, reserve for depreciation, development expenses, etc.

	Output.	Per Car.	Total Costs.
Runabouts	3,000	$446	$1,338,000
Touring Cars	2,200	478	1,051,600
Delivery Cars	800	424	339,200
Aggregate Total			$2,728,800
Annual Net Profits			$927,200
7% Dividend on Preferred Stock			70,000
Preferred Stock Redemption Fund (20% per annum for five years)			220,000
			$290,000
Annual earnings available for dividends on common stock and for additional working capital			$637,200

Associated with Fishback in his $3,000,000 venture are Julius J. Wittenberg, a New York real estate operator, who is vice-president of the company, and Peter R. Gilligan, "who has been prominently connected with the international banking house of John Munroe & Co.," who is secretary-treasurer. Among the directors are E. J. Willis, the New York automobile supply jobber; L. S. Cass, "president of an important Western railroad," and C. C. Wolf, "a leading banker of Parkersburg, Ia."

Although the Fishback factory has not yet been built and its profits are purely prospective, the Brown & Preston Co., which deals in "investment securities" at 25 Broad street, New York, not only recommends the Fishback "security" "as a safe and exceptionally profitable investment," but employs capital type apparently to emphasize the recommendation.

Duff Acquires Site for Jack Factory.

The Duff Mfg. Co., of Pittsburgh, Pa., manufacturer of Barrett jacks, has purchased a five acre site on Treble avenue, North Side, Pittsburgh, on which will be erected what is planned to be the largest plant in the world devoted exclusively to the manufacture of jacks. Ground will be broken about July 1st.

Making Larger the Marmon Plant.

Two stories are being added to one of the main factory buildings which comprise the Nordyke & Marmon plant in Indianapolis. They will be 52x243 feet, and this will add 25,300 square feet to the company's space. A new two-story office building, 43x153 feet, also is in course of erection.

MEN WHO HAVE SHIFTED POSITIONS

Resignations and Promotions That Served to Place Many Workers in New Places —Few Leave the Trade.

H. R. Viot, purchasing agent for the Metzger Motor Car Co., of Detroit, has resigned that office to accept a similar one in the Oakland Motor Car Co., of Pontiac.

B. R. Person has been appointed manager of the Studebaker branch in Memphis, Tenn., to which he has been attached for two years. He succeeds E. L. Jacoby, resigned.

T. T. Pevitrilli, who formerly was connected with the establishment in the capacity of chief salesman, has been appointed manager of the Opel Auto Import Co., of New York. He succeeds E. B. Evans.

Edward Wells has resigned as assistant sales manager of the E. R. Thomas Motor Car Co. to become a Thomas dealer in Jamestown, N. Y. He will direct the affairs of the State Garage, 119 East Third street.

Penrose Reed has been appointed sales manager for the recently organized Chicago Electric Car Co. He had been associated with the electric vehicle industry in Michigan and, therefore, is no stranger to his duties.

Bruce Daniels, the former automobile editor of the Indianapolis Star, has been appointed publicity manager for the Motor Car Mfg. Co., maker of the Pathfinder car. Daniels is the fifth member of the Star staff who has gravitated into the automobile trade within the past three years.

After having served several months as sales manager of the Westcott Motor Car Co., of Richmond, Ind., H. E. Shiland has resigned that office and returned to Michigan, where for many years he was prominent in Buick affairs. His future plans, however, have not been made known.

T. P. Ballinger, superintendent of the Warren Motor Car Co., of Detroit, has resigned that office to engage in the retail trade at Lansing, Mich., where he will handle the Warren car. He has been succeeded by F. J. Mould, who previously was connected with the Metzger Motor Car Co., of Detroit.

Howard E. Wagner, sales manager for Wyckoff, Church & Partridge, Inc., of New York City, has resigned that position to become sales manager for the Buffalo Electric Vehicle Co., which recently took over the Babcock Electric Carriage and three other Buffalo concerns. Wagner, of course, will make his headquarters in Buffalo.

H. L. McClaren has been appointed sales manager for the Kelly-Racine Rubber Co., of Racine, Wis. He has had twelve years' experience in the tire business, having started with Morgan & Wright in 1900 and ever since having retained identification with their interests, latterly in the central department of the United States Tire Co., in Chicago.

Ray Leeman, former publicity manager for the Overland Automobile Sales Co., of Dallas, Tex., has been appointed manager of the newspaper department of the Henderson Motor Car Co., of Indianapolis. In addition to his experience with cars, Leeman also is well versed in the tire business, having served as the manager of two Goodyear branches in Texas.

Fred E. Colver has been appointed manager of the truck department which the Locomobile Co. of America has organized as a part of its New York branch. Colver, who has been identified with the automobile trade for about eight years, will have charge of the Locomobile truck business not only in the New York district but in the surrounding territory.

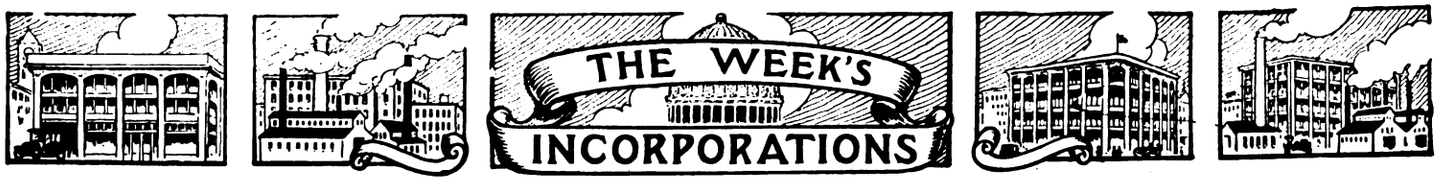
L. M. Fuller, who has been secretary and general manager for the Velie Motor Vehicle Co., of Moline, Ill., since its formation, has tendered his resignation, which will become effective September 1st next, when he will become the head of a new department now being organized by the Bausch & Lomb Optical Co., of Rochester, N. Y. Fuller, however, will remain a director of the Velie company.

E. LeRoy Pelletier, former advertising manager of the Studebaker Corporation, has been appointed advertising manager of the Everitt Motor Car Co., which will be the new name of the Metzger Motor Car Co. when its reorganization and re-financing is completed. Pelletier's connection with the Everitt organization will cause small surprise, as his utterances, and even some of the press matter which he sent out, while still in the employ of the Studebaker Corporation, clearly indicated that he was headed in that direction. Indeed, it is understood that it was this press matter that brought about his summary dismissal by the Studebaker people before he was quite ready to tender his resignation.

Dynamite Wrecks Long Island Garage.

What is supposed to have been an act of revenge by highwaymen resulted in the complete destruction of Henry S. Sands's garage and sixteen automobiles at Farmingdale, Long Island, N. Y., last Sunday morning, June 16th, when dynamite, placed in the basement, was exploded and the garage and cars were scattered over the adjacent landscape. Nearby buildings were damaged, and the immediate result of the explosion is said to have been a rain of automobile parts and fragments, with brick and wood. Sands believes the damage was done by two men who attempted to hold up a friend of his about three weeks ago on a lonely highway, but who were frightened away when Sands appeared on the scene in an automobile. The damage amounts to $50,000.

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Coudersport, Pa.—Penn Tire Filler Co., under Pennsylvania laws, with $5,000 capital; to manufacture tire filling compounds.

Auburn, Me.—O. R. Hunnewell Co., under Maine laws, with $50,000 capital; to deal in motor cars. Corporators—O. R. Hunnewell and others.

Galva, Ia.—Galva Auto Co., under Iowa laws, with $10,000 capital; to deal in motor cars. Corporators—G. W. Johns, R. B. Clemens, and others.

Jacksonville, Fla.—Dixie Garage, under Florida laws, with $5,000 capital; to operate a garage. Corporators—J. S. Arnold, Jr., P. E. Harry, H. V. Arnold.

Wilmington, Del.—Amplex Motor Car Co., under Delaware laws, with $1,000,000 capital; to deal in motor cars. Corporators—Norman P. Coffin and others.

Augusta, Me.—V-C Motor Co., under Maine laws, with $100,000 capital; to deal in motor cars. Corporators—Horace Mitchell, C. E. Smothers, William E. Sisk.

Indianapolis, Ind.—Central Garage Co., under Indiana laws, with $5,000 capital; to operate a garage. Corporators—Walter Howe, Kirke Howe, H. R. Sterling.

Santa, Ana, Cal.—West End Garage Co., under California laws, with $25,000 capital; to operate a garage. Corporators—C. F. Mansur, C. O. Mansur, A. C. Lantz.

Watertown, Wis.—Buroff-Fuller Motor Co., under Wisconsin laws, with $30,000 capital; to deal in motor cars. Corporators—E. G. Buroff, R. A. Fuller, W. C. Tietz.

Kinston, N. C.—Kinston Garage, under North Carolina laws, with $25,000 capital; to deal in motor cars and operate a garage. Corporators—William Hayes and others.

Chicago, Ill.—Windsor Park Garage, under Illinois laws, with $2,000 capital; to operate a garage. Corporators—Sidney E. Levy, Joseph D. Irose, Walter A. Rooney.

Henderson, Ky.—Park Garage Co., under Kentucky laws, with $1,200 capital; to operate a garage. Corporators—J. T. Dawson, W. H. H. Cambron, Jr., Ida M. Cambron.

East Palestine, Ohio—O & H Tire Co., under Ohio laws, with $50,000 capital; to deal in vehicles and rubber goods. Corporators—J. A. Oatsdean, C. F. Habable, A. S. Mauk.

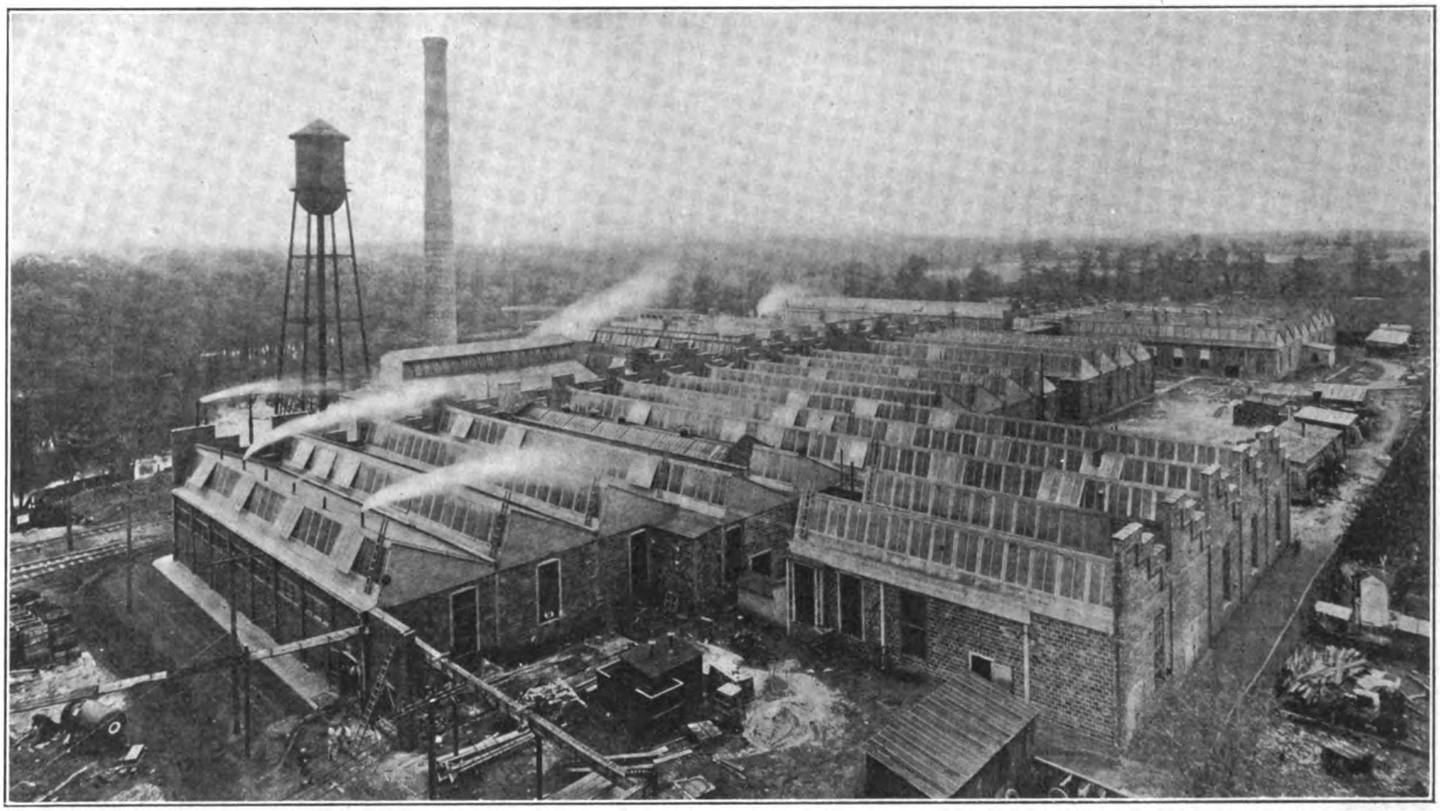
Camden, N. J.—Automobile Sales Corporation, under New Jersey laws, with $30,000 capital; to deal in motor cars. Corporators—P. L. Neel, J. R. Shoch, H. R. Shoch.

Los Angeles, Cal.—Schacht Motor Car Co., under California laws, with $100,000 capital; to deal in motor cars. Corporators—O. A. Walling, William Dietz, W. T. Kreitz.

New York, N. Y.—Audubon Auto Service Co., under New York laws, with $500 capital; to operate an automobile service. Corporators—Michael P. Caffe, 316 Greenwich street; Edmond Huerstel, 653 East 29th street; Julius M. Ferguson, 610 Riverside Drive.

Grand Rapids, Mich.—Grand Rapids Motor Realty Co., under Michigan laws, with $40,000 capital; to act as a holding company for the real estate of the Grand Rapids Automobile Club. Corporators—Charles A. Phelps, Alvan W. Brown, G. A. Hendricks, Elmer Kinsey.

Brooklyn, N. Y.—Non-Destructible Tire Protector Co., under New York laws, with $25,000 capital; to manufacture tire protectors, etc. Corporators—Martin Pelz, 849



RECENT ADDITIONS TO THE MICHELIN TIRE CO.'S PLANT IN MILLTOWN, N. J.

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Willoughby avenue; William Weiner and Herman Seufert, both of 202 Weirfield street.

Louisville, Ky.—Punctureless Tire Co., under Kentucky laws, with $5,000 capital; to manufacture vehicle tires. Corporators—Andrew T. Murphy, John H. O'Neil, John S. Hobson.

Tulsa, Okla.—Oklahoma Motor Truck Co., under Oklahoma laws, with $10,000 capital; to manufacture motor trucks. Corporators—P. E. Haworth, P. W. Herman, I. Spencer Cox.

Kenosha, Wis.—Motor Transportation Co., under Wisconsin laws, with $25,000 capital; to operate a motor delivery. Corporators—R. H. Welles, Peter Fisher, Jr., Albert Tunck.

Nashville, Tenn.—Paris Auto Transfer Co., under Tennessee laws, with $2,000 capital; to operate a motor delivery. Corporators—F. L. Hensler, M. H. Gohlston, E. P. Johnson.

New York, N. Y.—Knickerbocker Commercial Vehicle Co., under New York laws, with $300,000 capital; to manufacture commercial vehicles. Corporators—E. A. Dillenbeck, Jr., 107 West 82d street; J. B. Williams, 549 Third avenue; E. A. Smith, 201 West 14th street.

Whitesboro, N. Y.—Whitesboro Motor Car and Garage Co., under New York laws, with $1,000 capital; to deal in motor cars and operate a garage. Corporators—J. Webster Rogerse, 97 Howard street; Maybelle G. Malsan, Adrian S. Malsan, both of 75 Main street, Whitesboro.

New York, N. Y.—Pearson Reciprotary Motor Co., under New York laws, with $100,000 capital; to manufacture motors. Corporators—Charles O. Pearson, 320 East 5th street, Brooklyn; Charles L. Herrington, 1060 Lincoln Place, Brooklyn; James A. McCarren, 648 Eastern Parkway, Brooklyn.

Changes of Capitalization.

Indianapolis, Ind.—Overland Automobile Co. from $1,125,000 to $1,500.

Cleveland, Ohio—Park Motor Car Co. increased from $10,000 to $15,000.

Indianapolis, Ind.—Marion Motor Car Co. from $100,000 to $1,125,000.

Detroit, Mich.—Colonial Electric Car Co. increased from $10,000 to $20,000.

Cleveland, Ohio—Westman Motor Truck Co. reduced from $200,000 to $15,000.

Chicago, Ill.—Centaur Motor Co. of Illinois increased from $10,000 to $50,000.

Changes of Capital Stock.

Akron, Ohio—B. F. Goodrich Co. from $20,000,000 to $200,00.

Plano, Ill.—Mogul Motor Truck Co., from $125,000 to $500,000.

Ft. Wayne, Ind.—Independent Rubber Co., from $50,000 to $60,000.

Columbus, Ohio—Coffield Motor Washer Co. from $200,000 to $50,000.

INCREASES CAPITAL; CUTS "MELON"

United States Rubber Now a $120,000,000 Corporation—Plans for New Factory and Only One Brand of Tire.

To comply with the law, and to answer an objection raised by Samuel Hyman, representing a small minority, a special meeting of the stockholders of the United States Rubber Co. was held at its legal office in New Brunswick, N. J., on Monday last, 17th inst., at which the increase of its capital stock from $75,000,000 to $120,000,000 and the conversion of its second preferred into first preferred stock was formally ratified, despite the repeated protests of Hyman. The certificate of increase was at once filed with the state authorities, and on Tuesday the directors met and declared a 20 per cent. stock dividend, which amounts to $5,000,000, which was a part of the general program.

As is well known, the plans of the United States Rubber Co. include the erection of the "largest and best tire plant in the world," which, of course, will be occupied by the subsidiaries of the United States Tire Co. It will represent an expenditure of between $3,000,000 and $5,000,000, and while nothing definite has been decided, it is intimated that the plant will be located in the Middle West. Also the Hartford, Continental, G & J and Morgan & Wright brands will disappear from the market at the close of the present year. Instead, all products of the United States Tire Co. will hereafter be known as "United States" tires, an object which has been in view for the better part of a year and the way for which has been paved by the marketing of a "United States" tire while continuing the older and better known brands.

As already had been outlined, the refinancing plan calls for the issuance of $5,000,000 common stock, the conversion of $10,000,000 second preferred stock into $7,500,000 first preferred, and an issue of $10,000,000 first preferred stock, the proceeds of which are needed for working capital. There will then be outstanding $30,000,000 common stock and $57,500,000 preferred stock, with $10,000,000 common and $22,500,000 preferred remaining in the treasury.

No action has been taken respecting the bond issue to cover the outstanding obligations maturing during the next three years, which is in contemplation.

The 20 per cent. "melon" which was cut is payable to stockholders of record July 8th. To the holders of record July 12th of all the stock of the company of all classes then issued (thus including the holders of the new common stock issued as a dividend on July 8th) will be given the right to subscribe for $10,000,000 of first preferred stock to the extent of 12½ per cent. of their holdings. Subscription warrants will be issued upon which payment must be made on August 15.

Payments for stock on that date will entitle the holders to interest at the rate of 8 per cent. until October 1, 1912, being the same rate as the regular cash dividend now being paid on the first preferred shares. The interest from August 15 to October 1 will be equivalent to 1 per cent. on the par value of the stock subscribed for. The new stock will carry dividends for the quarterly period beginning on the latter date.

Franklin "Watches" Haynes's Departure.

Before he left for Detroit last week, where he will superintend the production of the new car which it is the purpose of Dodge Bros. to place on the market, F. J. Haynes, factory manager for the H. H. Franklin Mfg. Co., of Syracuse, N. Y., was given substantial evidence of the regard entertained for him by his superiors and the Franklin staff generally. He was tendered a dinner by President Franklin himself, which was attended by the directors of the company and the various department heads, and during the course of the evening was presented with a gold watch as a token of their esteem.

England Leaves Bay State for Michigan.

The England Mfg. Co., which produces metal stampings and automobile accessories, has removed from Amesbury, Mass., to Detroit, Mich., where it is occupying the factory at 1559 Jefferson avenue which once was used by the King Motor Car Co. J. Albert Davis, who at one time was of the lamp making firm of Gray & Davis, is prominently identified with the England company.

Melbourne Sets Date for First Show.

The first "regular" automobile show to occur in Melbourne, Aus., is scheduled to occur August 31st to September 7th next. It will be staged in the Exhibition Building in that city, a commodious and remarkably handsome structure, and will be held under the auspices of the Automobile Club of Victoria, Ltd., of which F. Leslie Bruford is secretary.

Six More Join the Credit Association.

The Automobile Trade Credit Association has added the following applicants to its membership roll: Bossert Co., Utica N. Y.; John T. Stanley, New York City; Lumen Bearing Co., Buffalo, N. Y.; Worcester Pressed Steel Co., Worcester, Mass.; K-W Ignition Co., Cleveland, O.; Globe Machine & Stamping Co., Cleveland, O.

American Title for English Company.

Motor Tours and American Agencies, Ltd., is the title of a new company which has been incorporated under British laws, with capital of $12,500, in $5 shares. Its official office is given as 5 Broad Street Place, London, E. C., but other than what its title suggests the exact purposes and scope of the company are not revealed.

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A. Sweeney is building a brick garage in Freeport, Pa.

Earl Smith is about to build a garage in Borup, Minn.

Dr. G. Fred Hart is erecting a garage in Webster, Mass.

Charles Symns is about to build a garage in Atchison, Kan.

R. A. DeMars is having a garage built in St. Thomas, N. D.

Adam Gaul of Pendleton, Ind., has sold his garage to Dr. Conner.

R. E. Donaldson of Milford, Ia., is building a garage, 50 x 120 feet.

J. H. Abbott has bought the Taylor Garage in Walla Walla, Wash.

Charles Thuman is about to embark as a garage man in Riverton, Ia.

George Ward is about to open a garage, 50 x 78 feet, in Primghar, Ia.

A. J. Budworth has purchased the North Side Garage in Belleville, Kan.

W. H. Abbey, owner of the Wasso (Cal.) Garage, has sold the business to I. H. Litten.

William Ahrens has opened a garage at Highland and Central avenues, Leonia, N. J.

Wallace Fetrow, Marysville, Cal., has opened a vulcanizing shop at C and 4th streets.

The City Garage is the style under which J. A. Dietsch has "opened up" in Defiance, O.

A garage is being erected in Centerville, Ia., for H. E. Luther, who is entering that business.

William Dickman of Riceville, Ia., has begun the construction of a one-story garage, 40 x 64 feet.

Richard Mead and Arthur Walker are erecting a garage in Rutland, Vt., on Clarendon avenue.

Ebner Wooden, of Stockton, Kan., has purchased William Shaw's interest in the Hockett Garage.

McKenney & McKenney have opened for business in Gilroy, Cal., under the style Southend Garage.

Benjamin Hudson has entered the automobile trade in Portsmouth, O.; he will handle Metz cars.

J. B. Hamilton is erecting a garage at 245 East Fourth street, Long Beach, Cal.; it will cost $6,000.

F. B. Higgins, Overland and Marion dealer in Fitchburg, Mass., has opened a garage at 53 Water street.

The Grand Auto & Garage Co. has opened up at 3441 Juniata street, South St. Louis, Mo. C. F. Hugo Mueller is the head of the business.

Emil Zorn, Wisdom, Mont., is about to open up as a garage proprietor; his quarters are 30 x 45 feet.

Louis Shinnert of Goodhue, Minn., is having plans drawn for a garage; it will be erected this summer.

A garage is about to be opened in Livingston, Mont., by Hornbeck & Loetscher, at 126 South Second street.

H. B. Freeman of Hartford, Conn., has sold the New Britain Ford agency to Arron G. Cohen of New Britain.

W. H. Wilhelm has purchaesd J. D. Mumaw's interest in the De Tamble Sales Agency, of Coshocton, O.

Herbert Duty and Clarence R. Polen have engaged in business in Marietta, O., under the style Standard Garage.

Ulmer Bros., farmers, near Scotland, S. D., have built a garage on their property and have opened for business.

William E. Brown of Yonkers, N. Y., has bought Lowa's Riverdale Avenue Garage, 217 Riverdale avenue, that city.

Under the style National Garage, John and Charles Allen have opened for business on Colby street, Woodland, Cal.

Arthur Wilson, of Spokane, Wash., has opened a garage at 228 Riverside avenue; it is a one-story brick structure, 50 x 75 feet.

Andrew Berkey of St. Paul, Minn., has opened a tire repairing and vulcanizing business at Sixth street and Smith avenue.

George Baehr of McKeesport, Pa., has commenced the construction of a $20,000 garage on Ninth avenue; it will be 60 x 134 feet.

The Marshall Bros. Livery Co., 5263 Delmar avenue, St. Louis, Mo., have taken on motor wagons. They are handling the Hatfield vehicle.

A new repair business, organized in Corona, Cal., by John Phillips, is to be incorporated under the style Corona Machine & Auto Works.

George C. Fossel of Philadelphia, Pa., has secured the necessary permit to build a garage, 44 x 100 feet, at 176 Manheim street; it will cost $4,000.

Wallace M. Scudder has accepted plans for a garage to be erected at 516-518 Parker street, Newark, N. J.; it will be 30 x 40 feet and will cost $7,000.

Charles Barker and others, of Terryville, Conn., have formed a company for the purpose of opening and operating a garage in Bristol, in the same state.

A. N. Linnett, Jr., of Newark, N. J., has entered the automobile trade in that city; he has the Briggs-Detroiter agency and has located at 51 Sherman avenue.

L. R. Pingrey and C. A. Waite, who constituted the West Liberty Auto Co., West Liberty, Ia., have dissolved partnership. Pingrey will continue the business.

To care for its owners in Battle Creek, Mich., the Jackson Automobile Co. has established a garage in that town; Frank Phillips is in charge of the business.

Grayling Machine Repair Co. is the style of a new concern in Grayling, Mich., of which Espern Hansen is manager. It will do a general garage and repair business.

The Brush Texas Motor Co. has been taken over by the United Motor Dallas Co. The consolidated establishment will remain under the management of M. A. Sacksteder.

The R. & L. Co., eastern agent for Garford cars, is about to open a branch in Brooklyn, N. Y., at Bedford avenue and Fulton street; P. C. Chrysler will be manager.

G. Whitney Williams and Arthur T. Schwaegler have opened a vulcanizing shop on Fourth street, Dubuque, Ia. They will operate under the style Hawkeye Vulcanizing Co.

Harry K. Moore, a dealer in Moscow, Ida., has also opened a garage in Walla Walla, Wash., under the style Moore Automobile Co.; his brother, F. C. Moore, will manage the new business.

George C. Boldt, of the Bellevue-Stratford Hotel, Philadelphia, Pa., is securing estimates for a garage to be built on Locust street, near Broad street. It will be four stories and 102 x 80 feet.

To build and operate a garage, a company has been formed in Traer, Ia., consisting of John Young, Ladd & Son, Soper & Boyer and others; the garage will be located at Second and Walnut streets.

City Garage & Sales Co. is the title of a firm which will enter the garage business in San Diego, Cal., as soon as its quarters are completed. Work is to begin at once on a two-story garage at Cedar and Cordova streets.

The Acton Garage, a five-story building at 137-139 West 89th street, New York City, has been sold to Dederick Brinckmann. R. G. Strange is president of the Acton Garage Co., which relinquishes the property.

W. W. Watson, agent for the Cheesman estate, Denver, Col., has secured authority to erect a two-story garage at Colfas and Lincoln streets, the estate to be the owner. The structure will be 138x127 feet and will cost $30,000.

The Shaw-Wells Co., S211 Washington

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street, Spokane, Wash., after six months' business, has dropped the American agency and apparently has left the trade. G. W. Lansing, the manager, said future plans were indefinite.

P. Corbin of New Britain, Conn., has secured the Connecticut agency for Fiat cars and engaged in business there. C. P. Merwin, formerly connected with the Corbin Motor Vehicle Co., is associated with Corbin in the new enterprise.

The Glover Automobile Co. has been organized in Philadelphia, Pa., to conduct a garage at 1327 Buttonwood street. Its officers are: President, H. B. Smith; vice-president, R. S. Glover; treasurer and general manager, E. O. Glover.

"The Owl" is the style under which a new electric garage in Minneapolis, Minn., will be operated by Fred H. Day and Harry J. Murphy. Their building, at Hennepin avenue and 24th street, will, when completed, be 70 x 70 feet and will have accommodations for 150 cars.

Following the disposal by Edward B. Zane of his interest in the Edward B. Zane Co., of Spokane, Wash., to Jack Stoner, a reorganization has been effected and a new name will be chosen. Stoner, owning two-thirds, is president-manager; Jack Doran is secretary-treasurer. The firm handles the Packard.

Under the style Spokane Tire Shop the fifth tire repair business to open in that Washington city is about to commence operations. Its quarters are at S113 Adams street, and J. R. Richards, until recently with the Interstate Rubber Co. and for five years previously an employe in the Diamond factory at Akron, O., will be manager.

A petition has been filed asking for the appointment of a receiver for the Memphis (Tenn.) Automobile Co.; General S. T. Carnes and others allege they are endorsers of the company's paper to the amount of $23,000; assets are given as $30,000. The company is said to have closed its business in March under a contract of sale to another concern; it is said the breaking of this contract brought on the present trouble.

W. P. Barnhart & Co., the Washington (D. C.) agents for Everitt cars, have taken possession of a new sales building and garage at 1707 Fourteenth street. The garage is termed a "society garage," but the reason for the designation is not made clear. At any rate, the building has a glass room and the salesroom is separated from the garage by a full-width plate glass door and both are finished in tan with hardwood and burlap trimmings.

Recent Losses by Fire.

Noblesville, Ind.—J. H. Fix & Son, garage and two cars destroyed. Loss, $5,000.

Malvern, Ark.—Malvern Livery & Auto Co., garage destroyed. Loss, $4,500.

Farmingdale, N. Y.—Henry S. Sands, garage and 16 cars destroyed by dynamite explosion. Loss, $50,000.

Boston, Mass.—Holt, Beebe & Co., automobile supply store, building and supplies damaged. Loss, $50,000.

Ridgewood, N. J.—Plaza Garage, fire and gasolene explosion, garage damaged, two cars destroyed. Loss, $7,000.

St. Louis, Mo.—Phillips Automobile Co., 5031-33-35 Delmar street, garage; Henry Ascher, 5037 Delmar street, salesroom; building gutted, 17 cars belonging to both firms destroyed. Car loss, $12,000.

"A" Company Still in Hot Water.

Despite doubts and troubles which have beset it since it was born, the "A" Automobile Co., which undertook to locate in Sacramento a plant which would enable the Pacific Coast to declare its independence of Eastern automobile factories, contrives to survive. Its way is still troubled, however, J. W. Ellenwood, of Ripon, Cal., having instituted suit to recover $4,100 which he had invested in stock in the peculiarly named project. The "A" company and T. F. Cooke and J. H. Remmers, the promoters, are named as joint defendants.

The promoters, it is stated, are operating solely on a commission basis, receiving 27 per cent. of their total sales of stock, which, according to accounts, has been purchased by several hundred different subscribers on the coast. Among them much dissatisfaction has existed, but when suits have been threatened or filed the amount of the subscription has been returned and new "prospects" located. It is also stated that when the promoters first found their way to Sacramento they sought the endorsement of the local Chamber of Commerce, but that it was denied after the report of an investigation by a special committee.

Stoddard-Edwards Start Work on Trucks.

The location of a factory site for the Edwards Motor Car Co. has not yet been decided, although there have been several rumors to the effect that C. G. Stoddard and H. J. Edwards definitely would locate somewhere in New Jersey, preferably in proximity to the plant of the Simms Magneto Co. in Bloomfield, the active management of which shortly will pass into their hands. Pending the incorporation of the company, which it is expected will be completed in the very near future, the production of commercial vehicles will be commenced, the small plant formerly owned by the Longest Bros. Co., of Louisville, Ky., having been acquired for the purpose. The plant heretofore has been operated as an experimental station, and not more than three or four trucks have been turned out. Stoddard and Edwards have purchased all these vehicles, together with the patents under which they are made, and will continue to produce the trucks at the Louisville plant, though their designs will be altered to permit of the employment of Knight engines. According to present plans, at least 25 vehicles will be produced and marketed before January 1st, 1913. No pleasure cars will be built in the Louisville plant, however. In the meantime, permanent headquarters for the embryo Edwards Motor Car Co. have been established on the seventh floor of the new United States Tire Co. building, at the corner of 58th street and Broadway, New York City.

Oldfield Takes up Carter's Clutch.

Barney Oldfield, who recently spent some time in California, has obtained the rights to a new type of automobile clutch and will devote part of his time, at least, to the marketing of it. The device, which will be known as the Oldfield clutch, is the invention of Samuel Carter of Los Angeles, and though it is of the familiar contracting band type, it differs from others in that the action of the clutch spring is supplemented by a centrifugal governor. In fact, it is said that the clutch will operate quite successfully without a spring, reliance being placed entirely upon the governor. The purpose of the governor, however, is merely to relieve the spring and to assist the clutch to grip at high speed. In operation, the governor balls in flying outward under the action of the centrifugal force, contract a Thermoid-lined band about a cast steel drum, the pressure of the band on the drum increasing as the speed of the engine increases. Consequently, as the speed of the engine drops off, the clutch tends to release and is held in engagement only by the spring.

Service Sites in Long Island City.

Following the example of a number of other interests allied in the automobile industry, the Goodyear Tire & Rubber Co., of Akron, O., has purchased a site in Long Island City not far distant from the service buildings occupied by the Packard, Lozier, Ford, Palmer-Singer, Benz and other companies. It is triangular in shape, with a frontage of 20.6 feet on Jackson avenue. Nor is the Goodyear company the only one recently to decide to transfer part of its activities to Long Island soil. The Harrold Motor Car Co., which is the metropolitan distributer for Pierce-Arrow cars, also has purchased property in Long Island City on which it will erect an up-to-date service building. The plot measures 200 x 200 feet and fronts on Jackson avenue at Sixth avenue.

Newark to Show Outside Circuit.

Although not included in the national circuit organized and sanctioned by the National Association of Automobile Manufacturers, Newark, N. J., has shied its castor into the ring for 1913, having set the date of its show for February 15-22. As heretofore, it will be held under the auspices of the New Jersey Exhibition Co., which is the title under which the Newark dealers operate, and will be held in the First Regiment Armory.

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THE MOTOR WORLD

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NEW YORK, JUNE 20, 1912

THE FIELD FOR AGRICULTURAL MACHINES.

Probably it is much easier to design and produce motor trucks than it is to design and manufacture motor driven tractors and other agricultural machines, but in overlooking the latter there is no doubt that not a few of the new people who have engaged in motor truck manufacture, not to mention the better established makers, have permitted and are permitting a golden opportunity to go to waste. It were well that some of them, at least, turn their attention in that direction, for the field is almost limitless and the probable reward enormously rich.

While the production of cars and trucks has reached a point where it abundantly can be taken care of by those who already constitute the industry, the surface of the agricultural field scarcely has been scratched, and it is one that will be tilled by new makers unless those positioned to till it make the most of their positions and advantages.

It is not in enormous threshers and binders in which the great opportunity lies, but rather in the development of small tractors, gasolene plows and other comparatively small implements. It is only the few pioneers in the development of such machines who know how great and how widespread is the interest in and probable demand for them. The volume of inquiries aroused by more or less casual printed mention and extremely spasmodic advertising of their vehicles has been so great as to transport these pioneers to at least an eighth heaven of delight. These inquiries leave no doubt of the demand that is awaiting; indeed, the very logic of events serves to outline it quite clearly.

The subject is one which should not be dismissed by those engaged in the industry. It has a distinct bearing on the future not only of the manufacturer but the dealer. For that dealer is wise who realizes that when the red fire which has illuminated the industry burns low, more than pleasure cars will be required to sustain him. It is this sort of dealer who is not permitting the motor truck to escape him and to fall into new hands, and he should be as quick to realize that no foundation is more secure than that which has to do with vehicles and implements of an agricultural nature. Horsedrawn vehicles and agricultural implements always have gone together, and there is no reason why modern and self-propelled developments of such contrivances should not be marketed through the same channels. and the desirability thereof should not be lost sight of.

ELECTRICAL LEARNING THAT IS LACKING.

In view of the thorough schooling in matters electrical that has resulted from years of ignition experience it may be surprising that not a few automobile engineers evidence a certain lack of familiarity with the construction and application of such more recently developed electrical apparatus as lighting systems and engine starters, but such, nevertheless, is the case, and it has been the cause of some discomfiture to both the makers and users of such devices.

The engineering lapses in this regard possibly may be ascribed to the fact that an ignition system is an inseparable part of every automobile engine, whereas, generally speaking, electric lighting systems and engine starters still are accessories or "extras" and are more or less foreign to the learning of the automobile engineer. Expertness in the application and adjustment of the one becomes almost automatic as a matter of course, for the efficiency of the engine depends upon it, but in the case of the others, the lighters and the starters, there may be a tendency to slur details in trusting too much to the reputation of the manufacturer of the system. Another possible reason for the apparent lack of familiarity is the natural disinclination of not a few persons to "fuss" with electrical apparatus of any kind for fear of disarranging its more or less complicated structure in such a manner as to be beyond repair at other than experienced hands.

As a matter of fact, however, it is doubtful if any combined electric lighting and engine starting system ever was more complicated, or more difficult to understand, than the ordinary high tension ignition system, which, in a comparatively short time, has been learned almost from A to Z without the expenditure of a great deal of effort. Considerably less effort is required to acquire a working knowledge of any of the combined lighting and starting systems on the market—none is surprisingly complicated—and in view of the markedly increasing popularity of electricity for such purposes it will be to the advantage of all concerned, the automobile engineer, the manufacturer of the system and the car user, if a more thorough knowledge of the subject is general. As it is, however, there is small excuse for permitting cars to leave a factory with the positive and negative connections of any electrical device reversed, and yet there are instances in which this has been done and thereby caused no little damning of the lighting and starting system that was employed, to say nothing of the inconvinience caused to the users.

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FOREIGN CORPORATION NOT OUTLAW

Highest Court Declares Interstate Contract Not Void—Far-Reaching Decision Rendered in A. C. A. Case.

Whenever two parties to a contract fall out and go to law, if they are located in different states it has become almost a matter of course for the party sued to attack the validity of the contract by alleging that the other party to it is a foreign corporation and, therefore, has no standing in the courts of the state in which the action is instituted. Many State courts have ruled diversely on the point, and the Supreme Court of the United States itself also has rendered opinions, but the fact did not serve to prevent that court of last resort from again taking cognizance of the subject in the appeal of David Lupton's Sons Co., of Philadelphia, Pa., from the decision in favor of the Automobile Club of America, of New York, rendered by the Circuit Court of the United States for the Southern District of New York, and from reversing the judgment of the lower court.

In the decision delivered last week by Mr. Justice Hughes, the court holds (1) that a foreign corporation may sue in the federal courts upon a contract made and for work performed in the State of New York, notwithstanding its failure to comply with the law requiring foreign corporations to obtain certificates of authority before doing business in that state, and (2) that such contracts are not void because of non-compliance with the statute, although the corporation may not sue thereon in the courts of New York.

The suit between the Lupton company and the Automobile Club of America grew out of a strike in 1905, which occurred when the Pennsylvania corporation was engaged in work on the A. C. A. club house in New York. After various negotiations, the club employed others to complete the work, for which it paid $3,796.76. The Lupton company itself received $5,837.72, a sum of $709.52 representing the balance of the contract price. The Lupton company brought suit in the Federal court of New York for $5,000 damages sustained by failure of the A. C. A. to permit it to complete the work.

In its defense, the club set up a counterclaim and several defenses, among them that the Lupton company could not maintain its action because it was a foreign corporation doing business in the State of New York without the certificate of authority required by the general corporation law of that state.

When the suit was decided in favor of the Automobile Club of America, the Lupton company appealed to the Supreme Court of the United States, which, as stated, last wek reversed the court below. While the cause of the dispute is of small interest, the point involved is of such general moment to all corporations doing business in New York and other states that the opinion of the Supreme Court is of far-reaching importance. After summarizing the many features of the case, Justice Hughes, in delivering the opinion of the court, said:

"Upon written stipulation the action was referred to a referee to hear and determine the issues. The referee reported his findings of fact and conclusions of law, holding that the contract was void under the statute, and that the complaint should be dismissed. Upon the plaintiff's application the report was recommitted in order that further findings might be proposed. The referee then passed on numerous requests submitted by the plaintiff, and on the filing of his supplemental report, which left unchanged the original conclusions of law, judgment was entered for the defendant. The Lupton company brings the case here on writ of error to the Circuit Court upon the ground that the New York statute, as applied to the transaction in question, was in contravention of the Constitution of the United States as an unwarrantable interference with interstate commerce."

(Continued on page 55)

Speedway to be First "Horseless City."

Unaccompanied by fireworks, the automobile industrial colony projected by Carl G. Fisher and James A. Allison, principal owners of the Indianapolis Motor Speedway and the Prest-O-Lite Co., already is actually taking shape, the colony's factory already being in process of construction and railroad tracks being laid on the site of the town, which will be named Speedway. It is adjacent to the Indianapolis speedway, and will stand as the first "horseless city." The factory, on which work already has been started, will combine the four Prest-O-Lite plants now scattered throughout Indianapolis and the two in Milwaukee. Two automobile manufacturers and six parts makers also are expected to locate in Speedway, the streets of which will bear the names of such automobile pioneers as Selden, Haynes, Olds, Winton, Ford and others. Several hundred houses for workmen will be erected, all of them of the "poured" concrete type, and all will be made purchasable by mechanics on easy terms. Parks, playgrounds, etc., also are a part of the plan.

Alco Trucks After New Record.

The Thomas B. Jeffery Co., having received an order from Watertown, Wis., for a Rambler car, the order being delivered at the factory door in Kenosha by aeroplane, another "first on record" is to be created by the American Locomotive Co., which is co-operating with a Philadelphia firm, Charles W. Young & Co., to deliver an Alco truck load of soap to a consignee in Pataluma, Calif., the Carlson-Currier Co. The 4,400-mile journey will be undertaken to-day, 20th inst., and when completed it will stand as the first transcontinental delivery of soap, or any other old thing, by motor truck.



June 20, Chicago, Ill.—Chicago Motor Club's annual hill climbing contest on Algonquin Hill.

Jnue 20-22, Portland, Me.—Pine Tree Motor Contest Association's reliability run.

June 23, Youngstown, Ohio—Track races on Southern Park Speedway, promoted by E. A. Moross.

June 23-29, Laurel, Md.—Track races promoted by R. E. Shadel.

June 25, Denver, Colo.—Denver-Chicago sociability run, under the auspices of the Denver Chamber of Commerce.

June 27-29, Detroit, Mich.—Midsummer meeting of the Society of Automobile Engineers.

July 4-5, Tayor, Tex.—Track races under the auspices of the Taylor Automobile Club.

July 4-6, Old Orchard, Me.—Beach races under the auspices of the Old Orchard Automobile Association.

July 5-6, Tacoma, Wash.—Road races under the auspices of the Montamara Festo Automobile Commission.

July 15-20, Milwaukee, Wis.—Reliability tour, under the auspices of the Wisconsin State Automobile Association.

July 15-16, Cleveland, Ohio—Reliability run under the auspices of the Cleveland News.

August 8-10, Galveston, Tex.—Beach races under the auspices of the Galveston Automobile Club.

August 23-24, Elgin, Ill.—Chicago Motor Club's national stock chassis road races.

September 2-3, Indianapolis, Ind.—Races on the Motor Speedway, promoted by the Indianapolis Motor Speedway Co.

October 7-11, Chicago, Ill.—Chicago Motor Club's reliability run.

Seattle Checks Official "Joy Riding."

The prevalence of "joy riding" by officials and municipal employes in Seattle, Wash., appears to have influenced the passage of a measure last week providing for the establishment of a garage for the housing of all municipal cars and a check system that will record the goings and comings of all of them. The appropriation for the garage was vetoed by the mayor, but was passed at the eleventh hour only with the assistance of an alderman who rushed from Minneapolis to his home town to cast his vote for the measure. Opposition still exists, and the corporation counsel declares he does not believe the ordinance is legal.

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HISEY AND RADINA SHARE HONORS

They Do Best Work on Cincinnati Hill, Hisey Making Fastest Flight—Raimey Ascends in a Blaze.

With ideal weather, a course in perfect condition, and enough contenders to make things interesting, the annual hill climb of the Cincinnati Automobile Dealers' Association, which was decided on Saturday last, 15th inst., on the Stanley avenue hill, provided excitement in plenty for the very many spectators who lined the course. Excitement, however, was not all of that sort which comes of speed, for some of the thrills were caused during the third of the seven events programmed, when John Raimey drove his Ohio car up the incline with flames issuing from each crevice in the dust pan and hood; nor did the driver deign to stop until the course had been completed. The fire, which undoubtedly looked formidable when fanned by the wind, was quite easily extinguished when the summit of the hill had been attained.

H. Hisey, in a Buick, was the star of the occasion. He gathered three firsts and made the fastest flight, negotiating the 273-feet-less-than-a-half-mile course in 0:29⅘ seconds.

Hisey's "bag" might have been even still larger, but he started only in the three events which he won. They were the second event for cars of 161-230 inches displacement, in which he negotiated the distance in 0:34⅘; the fourth event for cars of piston displacement between 301 and 450 cubic inches, and the last event, a free-for-all, in which he made the best time at 0:29⅘. Fred Radina, who piloted a Cino car, won two events—one, open only to members of the Cincinnati Automobile Club, in which he completed the course in 0:34⅗, racing against a single contender, H. J. Groesbeck, in a Chadwick; and a free-for-all with cars loaded with four passengers. His time for the latter victory was 0:34¾.

The two events which did not go either to Hisey or to Radina—one for cars in Class C, under 160 inches displacement, and the other for Class C, 231-300 inches displacement—went to L. A. Sackett, who drove his Flanders up the incline in 0:37, and William Fritsch, who drove a Cino, and won in 0:31⅕. The summary:

Class C, under 160 cubic inches displacement—Won by L. A. Sackett (Flanders). Time, 0:37. Second, O. J. Palm (Herreshoff). Time, 0:40⅗.

Class C, 161-230 cubic inches displacement—Won by H. Hisey (Buick). Time, 0:34⅘. Second, A. F. Shane (Metz). Time, 0:38. Third, Al Maiden (Elmore). Time, 0:41⅕.

Class C, 231-300 cubic inches displacement—Won by William Fritsch (Cino). Time, 0:31⅕. Second, J. Raimey (Ohio). Time, 0:31⅘. Third, W. B. Hamberly (Elmore). Time, 0:41.

For members of the Cincinnati Automobile Club, cars carrying four passengers—Won by Fred Radina (Cino). Time, 0:34⅗. Second, H. J. Groesbeck (Chadwick). Time, 0:42.

Class C, 301-450 cubic inches displacement—Won by H. Hisey (Buick). Time, 0:29⅗. Second, A. Dixon (Stutz). Time, 0:37⅗. Third, John Jenkins (Cole). Time, 0:42⅕.

Free-for-all, cars carrying four passengers—Won by Fred Radina (Cino). Time, 0:34⅗. Second, A. F. Shau (Chadwick). Time, 0:43⅕.

Free-for-all—Won by H. Hisey (Buick). Time, 0:29⅗. Second, William Fritsch (Cino). Time, 0:31⅕. Third, J. Raimey (Cino). Time, 0:31⅘.

Date Finally Set for Vanderbilt Race.

Though no official sanction has as yet been issued by the American Automobile Association for the Vanderbilt cup race, which, together with the Grand Prize, the Wisconsin Trophy race and the Pabst trophy race, is to be run in Milwaukee, the date for the contest at last has been definitely settled. Following a conference between Bart J. Ruddle, president of the Milwaukee Automobile Dealers' Association, and Chairman Schimpf of the Contest Board of the A. A. A., it has been decided to run the Vanderbilt cup race on Saturday, Sept. 21st. The two smaller contests, namely, the Wisconsin and Pabst trophy races, will be run on Friday, Sept. 20th. It is not nearly as certain, however, just when the Grand Prix race will be run, though it is altogether likely that the preceding Saturday (Sept. 17th) will be chosen. As yet Ruddle has made no formal application to the Contest Committee of the Automobile Club of America, which sanctions the Grand Prix race, to have the date altered from Sept. 21st, which originally was chosen, to the 17th. In view of the fact that the Vanderbilt will be run on the 21st, however, it is practically certain that the date will be altered and the Grand Prix will become the curtain raiser.

Washington Endurance Contest Postponed.

The board of governors of the Automobile Club of Washington, D. C., which organization was to have conducted a three-day endurance contest, which had been scheduled to start Tuesday last, 18th inst., has postponed the event with the expectation of running it some time early in the fall of the year. Lack of sufficient entries is given as the chief reason for the postponement.

Berlin Forbids Chauffeurs to Smoke.

Berlin, which already forbids smoking by drivers of horse cabs and taxicabs, is about to extend the no-smoking regulation to all chauffeurs. The German authorities are possessed of the idea that, in busy cities, at least, the practice of smoking diverts too much of a driver's attention.

DISBROW, DUST AND A DEAD HEAT

They Combined to Make Kansas City's Racemeet Interesting—"Bill" Endicott Takes the Australian Pursuit.

Disbrow, dust and a dead heat were the chief features of the racemeet conducted Saturday last, 15th inst., by the Automobile Club of Kansas City, on the track at Elm Ridge, Mo. Although Disbrow, driving a Simplex, created track records both for one and for five miles, his time being 51⅘ seconds and 4:39⅕ for the respective distances, the records were made when no other car was on the track, and the dust raised was all behind him. Where two or more cars were contending, however, the great clouds of dust suggested Kansas cyclones and made fast flights perilous. Besides shattering the old track records of 56 seconds and 4:56 for the single and five miles, respectively, Disbrow made the best time of the day when he drove the reconstructed racing car Jay-I-See for a single mile in 59 seconds, and he also finished first with the Simplex in the last event of the day, a five-mile free-for-all, which he completed in 5:20.

Most of the interest, however, was aroused by the Australian pursuit race, which went for ten miles. Four contenders, Joe Nikrent in a Case, Louis Disbrow in a Simplex, "Bill Endicott, who piloted a Schacht, and Ulbrecht in a Little Giant, started, but only Endicott and Disbrow finished, in the order named, the others being "tagged" and dropping out. Endicott won in 9:46. A five-mile match race between Endicott in the Schacht and Joe Nikrent at the wheel of a Case car resulted in a dead heat, the time being 5:19⅘. The draw was decided by the interpolation of an extra event, which went for a single mile and was won by Endicott in 1:03 from a flying start.

Two five-mile events for non-stock cars went to the Case driver, Joe Nikrent, and Ben Lamon, who drove a Buick, respectively; their times were 5:35⅘ and 6:20⅗. Nikrent also made the best time in the one mile time trials, when he drove his Case over the prescribed course in 1:01⅗ as against 1:03 made by Disbrow, also in a Case, and 1:05 made by McLain, who piloted a Velie. The summary:

One mile, time trials—Joe Nikrent (Case), 1:01⅗; Louis Disbrow (Case), 1:03; McLain (Velie), 1:05.

Five miles for non-stock cars—Won by Joe Nikrent (Case); second, Louis Disbrow (Case); Ulbright (Little Giant), withdrew. Time, 5:35⅘.

One mile, time trial—Louis Disbrow ("Jay I See"). Time, 0:59.

Five miles, non-stock cars—Won by Ben Lamon (Buick); second, McLain (Velie). Time, 6:20⅗.

Five miles, match race—Dead heat be-

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tween W. Endicott (Schacht) and Joe Nikrent (Case). Time, 5:19⅘.

One mile, match race—Won by W. Endicott (Schacht); second, Joe Nikrent (Case). Time, 1:03.

Ten miles, Australian pursuit race—Won by W. Endicott (Schacht); second, Louis Disbrow (Simplex). Time, 9:46.

Five miles, for track record—Louis Disbrow (Simplex). Time, 4:39⅘. Old record, 4:56.

One mile, for track record—Louis Disbrow (Simplex). Time, 0:51⅘. Old record, 0:56.

Five miles, free-for-all—Won by Louis Disbrow (Simplex); second, Joe Nikrent (Case). Time, 5:20.

Burman Takes Two Events at Toledo.

Although the mud was thick on Saturday last, 15th inst., and the track at the Lucas County Fair Grounds, just outside the city of Toledo, O., was slippery, as a consequence, neither served to prevent Robert Burman from taking a fresh grip on the Remy "meal ticket," the Remy Brassard, though once during the running of the usual three heats of three miles each, the spectators were permitted to imagine that his fingers were loosening and that an outsider would taste its benefits. Reversing the usual order of things, the outsider, in the person of one Louis Meneghetti, an Italian, who piloted a Mercedes, was allowed to win the first leg on the trophy. But his triumph was short-lived, for in the two following heats Burman easily beat him in an Ohio car which but lately has been added to Moross's "stable." Bert Dingley "also ran" in all three of the heats, his mount being a Benz. Driving the same car, Burman also captured a five-mile Class C event in 5:56, and later ran away from Bert Dingley in a Benz and N. F. Evans in a Chalmers in the five-mile handicap which closed the performance. Dingley had five seconds handicap and Evans started from the 15-second mark. Only three events made up the program, which was fathered by E. A. Moross.

Kansas Scores One on the Horse.

While the East with its automatic factories and large motor car equipment for commercial purposes has seemed possessed of an idea that when horses finally were backed off the boards the first grand sweep would be in some eastern section it has remained for a little western town to make claim to be the first community to entirely dispense with horse livery stables. From Hiawatha, Kan., comes the story that the only livery barn left in town has been closed through the inroads made upon its business by the garage liveries. This last stable was sold at auction, and hereafter traveling men wanting vehicular transportation over the country roads will have to rely upon the automobile. Fifteen miles to the north the little town of Falls City, Neb., has done likewise. In Hiawatha there are four automobile liveries.

NEW IDEA IN NEW YORK'S TAGS

More Than Color Will Be Changed for 1913—Smart Trick of Using Truck Tags to be Checkmated.

Although he first considered blue and white as a color combination for the 1913 New York number plates, Secretary of State Lazansky now inclines to white numbers on a purple background, but he has not reached a definite decision. The year—"1913"—will appear on the number plates for the first time; also there will be a special plate for commercial vehicles, on which the word "Commercial" will appear, and which will put an end to a trick which has been employed by certain owners who, for $5, purchased a plate designed for use on trucks but who displayed them on their cars, thereby saving from $5 to $25, the plates for both classes of vehicles being the same. Manufacturers' plates, however, will bear the letter "M," as now is the case. The bid of the Manhattan Supply Co., of New York, which was accepted, is at the rate of 30 cents for each pair of plates, 90,500 of which have been ordered; they are to be delivered before October 1st next. The contract for chauffeurs' badges has been awarded to the Lamp Stamp Works, of Albany, at 5½ cents each. They will be oval in shape, instead of round.

Missouri Swains Must Boost Roads.

Missouri generally can be depended upon to furnish a news story almost any day in the week, and the state is either productive of interesting events or the journalistic element of that "meerschaum" country works nights keeping the state on the map. One of the latest yarns concerns the good roads movement, and while it generally is known that the western country goes after progressive matters in its own aggressive way, the father of the story says that things about Macon, Mo., have reached such a pass that unless the swains of the countryside and village are armed with membership credentials in some good roads organization, the young women refuse to receive them. Whether the feminine action emanates from a desire in general for good roads or from an inclination for a highway for moonlight touring is not stated.

Snake-Killing Stirs Part of Kansas.

"How old is Ann?" "Why Is a Mouse When It Spins?" and other momentous questions have had their day and each is as far from settlement as the question which, according to more or less veracious chroniclers, now involves Kansas in the throes of heated debate. The state, or at least that part about Atchison, has lined up in factions on the problem, "Can a Snake be Killed by Running a Motor Car Over It"? At the head of the "Can" faction is Edward Donnelly, while the "Can't" side of the argument is led by Walter Bell. "Both are reliable men and both have run over snakes," one leading citizen is quoted as saying, "so how can it be decided"?

Just what started the discussion is not known, that part has been forgotten in the flurries of the present. Anyhow, when it did start Bell, with the corroboration of witnesses, told how when speeding along a highway his car bumped over a snake with such force that everyone expected to find Mr. Snake a glistening corpse in the dust, but instead the supposed victim, sniffing disgustedly at the odorous exhaust, gave his tail a saucy flirt and glided into the deep grass.

Then Donnelly disputed this with his belief. He told of how on the roads of this same county he ran upon a snake in the road and left it limp and corpselike, having investigated to see if the snake was really dead. The similarity of incidents and the nearly equal size of the two snakes—both, however, were not small—all serve to make it seem necessary to have an official test.

Electric Dealers Eliminate Guessability.

Fourteen members of the New York Electric Automobile Club participated in what passed as its annual 'suburbaning" contest on Saturday, 15th inst. At the last moment, however, the secret time, or "guessability," feature of the affair was eliminated and the contest became a pleasure run pure and simple. Most of the participants were tradesmen interested in the sale of the cars which they drove, but five women also appeared in the line-up.

National Quits Racing for the Present.

Content to rest on the laurels gathered in the International Sweepstakes race on the Indianapolis Speedway on May 30th last, to say nothing of the string of previous victories to its credit, the National Motor Vehicle Co., Indianapolis, Ind., has abandoned racing, for the present, at least. During the remainder of the 1912 season there will be no factory-entered Nationals in any contests, press of business being given as the reason for the retirement.

Bushnell Heads South Dakota Body.

Dr. W. F. Bushnell of Elk Point is the newly elected president of the South Dakota Automobile Association, which held its annual meeting at Watertown. A. L. Sherin of Watertown is treasurer and Dr. J. S. Opland of Beresford is secretary. The board of directors comprises Messrs. Bushnell, Sherin and Opland and J. F. Scroggs, G. Anderson, A. C. Wilson, F. R. Meadows and A. L. Sherin.

Iowans Select McGrew to Lead Them.

Dr. Andrew McGrew, of Stacy, has been installed in the presidential chair of the Southwestern Iowa Automobile Association. The other officers elected are: vice-president, A. L. Lenocker, Oakland; secretary, Roy A. Stacey, Adair; treasurer, O. R. Savage, Stuart.

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REVISION OF THE PACKARD "SIX"

New Oiling System, Electric Lights and Three-Quarter Elliptic Springs Principal Features—Larger Bodies.

Building on the strength of another successful season, during which it has not been found necessary materially to alter either the design or construction that has made its line what it is, the Packard Motor Car Co., Detroit, Mich., will continue to produce the three chassis which heretofore have claimed its entire attention.

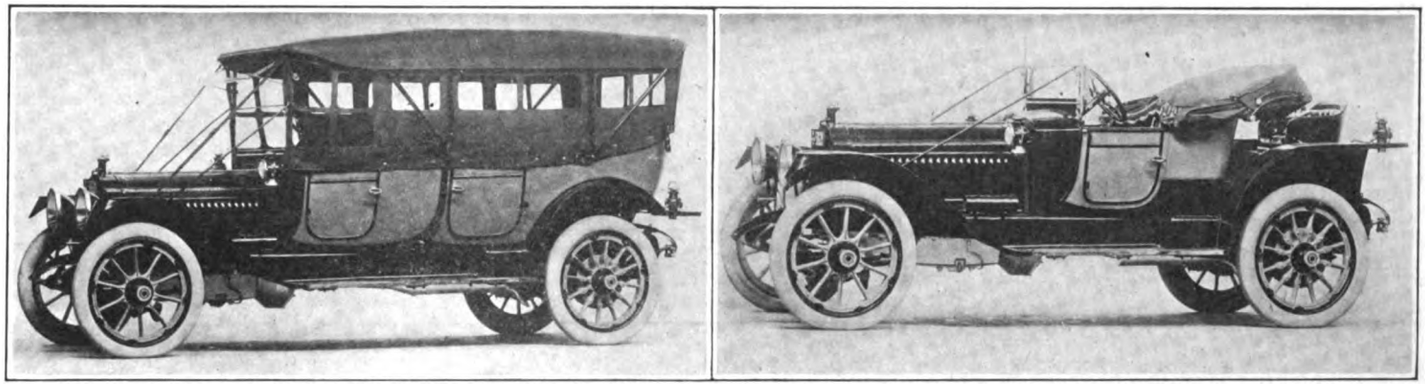
Naturally, the six-cylinder 48-horsepower model, which at the time of its debut last year easily assumed the position of leader of the line—a position which it still holds with conspicuous success—is calculated to merit closer scrutiny of its vital features, if for no other reason than that both the "18" and the "30," which are four-cylinder models, have become so numerous as to have familiarized both their external appearance and their distinctive construction, both of which remain and have remained for a number of years substantially without change.

In the "six," however, several important modifications have been made, including among other things the adoption of a new engine oiling system and a complete electric lighting system, though in the main the vital features which were instrumental in firmly establishing the first Packard "six" have been retained.

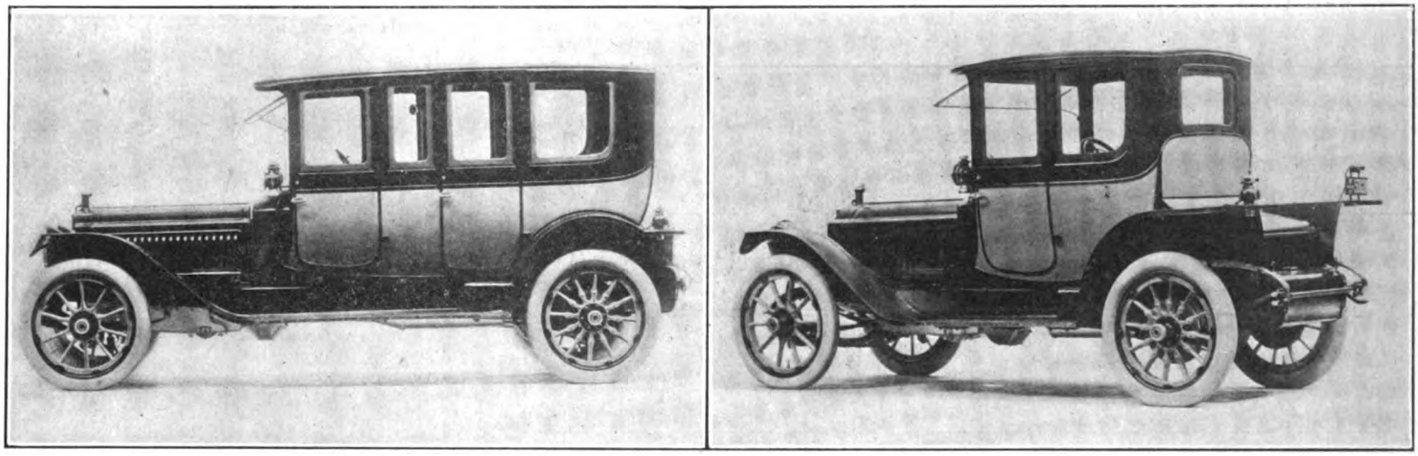
In its essential features, the motor remains unchanged, the cylinders being cast in pairs with the valves on opposite sides. The bore and stroke are 4½ inches and 5½ inches, respectively, and though the rating thus is but a nominal 48 horsepower, factory tests have shown that as high as 82 horsepower can be generated. The figure necessitates a comparatively high rate of piston speed, of course, crankshaft speed being 1,700 revolutions a minute, though it is not any higher than daily is expected of even heavier engines. But such excessive speeds scarcely are calculated to conduce to longevity, and it was in view of this fact that the Packard motor was designed to operate at greatest efficiency at comparatively low speeds. Its nominal rating of 48 horsepower is attained at 850 revolutions a minute.

In adopting the oiling system which is one of the new features of an otherwise old and well-tried engine design, two considerations have been kept in view. The first of them is the desirability, or, in view of the growing sentiment, the necessity, of eliminating all smoke, and the second is equally laudable in that it reflects a successful attempt to mitigate the voraciousness of the average engine for lubricating oil. To accomplish these two results, which, combined, operate to effect materially greater oiling efficiency, cylinder lubrication by splash has been done away with entirely by placing baffle plates below the cylinders and between them and the crankcase. Under the new method, the oil is forced directly to the main bearings and the wristpin bearings, the overflow, which is led through suitably placed ducts, lubricating auxiliary bearings and other moving parts, including the pistons and cylinder walls. An auxiliary system, which is interconnected with the throttle forces oil directly to the cylinder walls, the position of the ducts being plainly visible in the accompanying pictures. The system operates in conjunction with the main lubricating system, with which it is connected by means of a check valve. It does not become operative, however, until the throttle has been opened one-third. Thereafter the amount of oil fed to the cylinders varies according to the size of the throttle opening.

Among a number of other general refinements of design which are apparent, and which increase the efficiency of the power plant as a whole, is the adoption of a new form of coupling between the engine exhaust manifold and the pipe leading to the muffler. In order to eliminate the



ARRANGEMENT OF CURTAINS INSIDE TOP BOWS ON PACKARD "SIX" AND THE ROADSTER MODEL



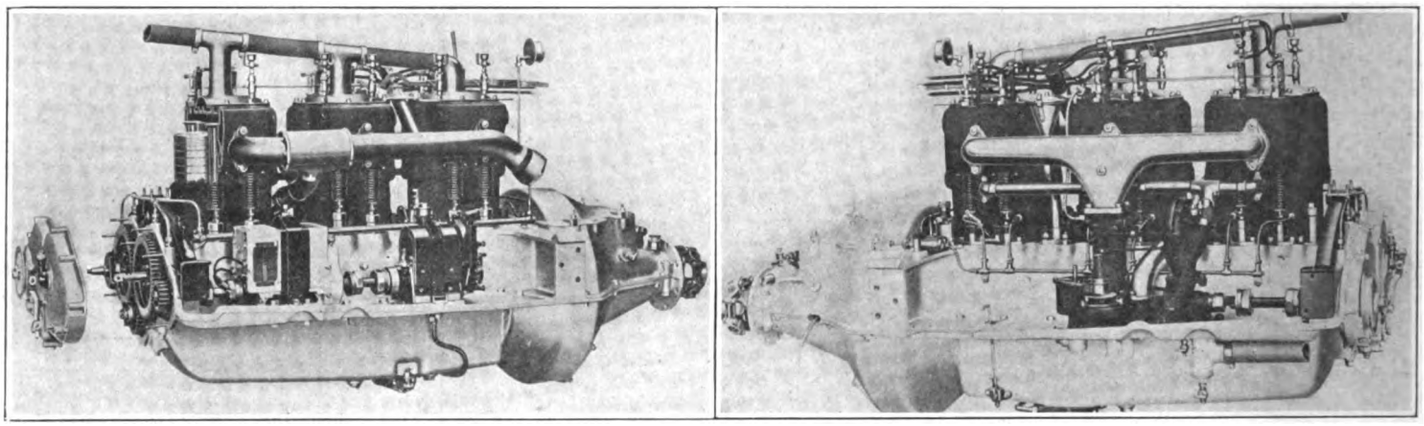
FULLY ENCLOSED BROUGHAM—A NEW PACKARD MODEL—AND THE INSIDE DRIVEN COUPE

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chance of torsional strains loosening bolts, or at the worst rupturing the pipes, this coupling takes the form of a flexible stuffing box which permits of a certain amount of movement without serious consequences. Another of the new features is the addition of an acetylene priming device, which is calculated to render the starting of the motor more positive, particularly in cold weather. It is located on the exhaust side.

In recognition of the rapidly increasing popularity of electric lighting, which is ometer lamp, which thus becomes a telltale and gives evidence of the failure of the former. In the general clearing away of obstructions from the running boards, the tool box also has found a place under the driver's seat, where it is accessible, though out of the way.

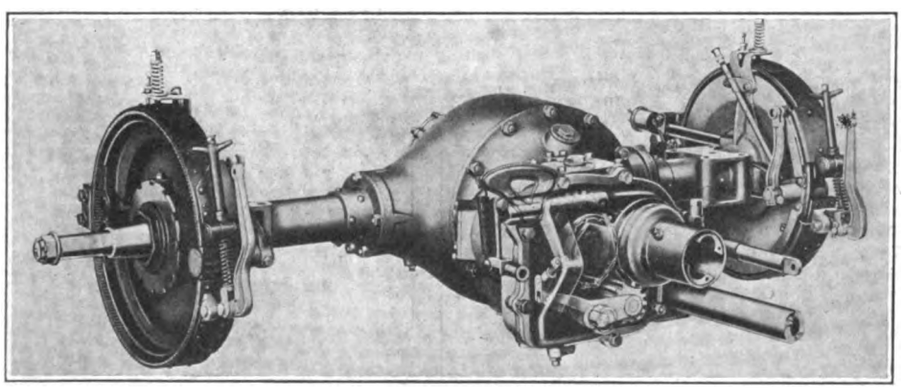
The distinctive Packard unit power plant is included in a single solid casing, the dry plate multiple disk clutch and the flywheel being retained intact. As heretofore, the three-speed semi-progressive change speed new radius rod bracket. The new location of the fuel tank requires, of course, that pressure be maintained on the gasolene, and for this purpose a positively driven plunger pump located on the engine is used. An automatic pressure relief valve, to maintain the pressure constant, forms part of the new system and is located beneath the driver's floorboards. The location of the tank has made possible the adoption of a drain cock, which is designed to permit the drawing of small quantities of gasolene,



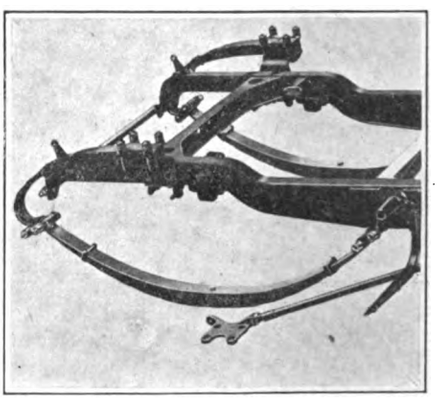
PACKARD "SIX" ENGINE SHOWING LIGHTING DYNAMO POSITION AND THE NEW OILING SYSTEM

thoroughly in keeping with its convenience and general desirability, the revised "six" is equipped with a complete system, as a matter of course. The dynamo is mounted on the exhaust side of the motor on a bracket which is bolted to the crankcase. It is driven through the intermediary of gearing and is so attached that its removal merely requires the loosening of a single bolt. Instead of being mounted on the mechanism is mounted in a unit casing with the differential gear. One of the minor changes which has been made in the transmission mechanism pertains to the radius rods. As now constructed, the radius rod bracket is made into a plate which is held to the rear axle by the spring clip. It serves also as the lower shock absorber bearing pin, making for simplicity and accessibility. The front springs are of the for priming or other purposes, and also to permit water which may have collected to be drained off.

Changes in body construction are no less important than changes in other structural details, and have been made with a well-defined purpose to increase the bodily comfort of occupants of the seats. By approximating in the open cars the lines of the limousine, which include a sweeping curve



PACKARD "SIX" REAR AXLE UNIT SHOWING CHANGE GEAR



NEW FRAME ARRANGEMENT

running board, which is the usual position, the battery which forms an inseparable part of any system, is carried in a cradle suspended below the chassis frame under the driver's seat. The remainder of the lighting system includes the usual complement of lamps—namely, two head lamps, two side lamps and a tail lamp, and, in addition, a second tail lamp, styled a "glow-worm," which is intended merely to illuminate the license plate. This second tail lamp is connected in series with the dashboard speed-

semi-elliptic type, though the rear springs, which formerly were of the same type, have been replaced with three-quarter elliptic members.

Another of the more noticeable alterations embraces the relegation of the gasolene tank to a position below the body at the rear thereof. Its protection and proper suspension has necessitated some slight rearrangement of the chassis frame members, the new construction being shown quite clearly in the picture, which also shows the

at the back, bodies have been made very much roomier. In fact, the body length of the touring cars has been increased some six inches, without affecting the wheelbase of the cars. Three inches of the six-inch expansion permits more leg-room in the tonneau and gives the occupants of the auxiliary seats more latitude; the front compartment is one inch longer and the lower body is two inches longer, allowing for greater storage capacity. Incidentally, the width of the touring body just forward of

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the rear seat has been increased seven inches. The front seat in all the models remains the same width and is undivided. As usual, all bodies, including roadster, touring, phaeton, coupe, limousine, imperial limousine, landaulet and imperial landaulet, are constructed of aluminum mounted on substantial white ash frames.

Carrying the electrical equipment a little further than is usual, all the bodies are wired for both electric horn and speedometer light. Equipment varies according to the particular style of body, though a top with boot and a folding windshield are supplied without additonal expense on all the open bodies.

German Exports Gain 64 Per Cent.

During the first quarter of the current year Germany's exports of motor vehicles continued the gains which marked that branch of its industry during 1911. For the three months, the value of pleasure cars exported was $3,681,250, as against $1,441,250 for the corresponding period of the previous year, a gain of 64.3 per cent. Exports of commercial vehicles increased in even greater proportion, from $176,750 to $410,250. Despite the growth of the home industry, Germany's imports of cars increased from $234,000 to $725,000, or 47.6 per cent. Imports of commercial vehicles during the same period jumped from $89,250 to $139,000.

Smith Plant Through with Automobiles.

The last effort to revive the bankrupt Smith Automobile Company, of Topeka, Kan., having failed, the plant has been sold to the Perfection Metal Silo Co., of Kansas City, and hereafter will be utilized for the production of such prosaic things as metal silos and culverts. The purchase price of $27,500 includes the plant and equipment and several automobiles.

Big Orders Lead to Remy Enlargement.

Plans for the enlargement of the factory of the Remy Magneto Co. at Anderson, Ind., are in process of execution. Among other things, the enlargement was influenced by the booking of the Willys-Overland and Buick contracts for 1913, the orders aggregating 70,000 magnetos.

Cincinnati Dealers Elect Officers.

At its annual meeting last week, the Automobile Dealers' Association of Cincinnati, Ohio, elected officers for the ensuing year, as follows: President, H. S. Leyman; vice-president, Robert C. Crowthers; secretary, E. A. Kruse; treasurer, W. G. Welbon.

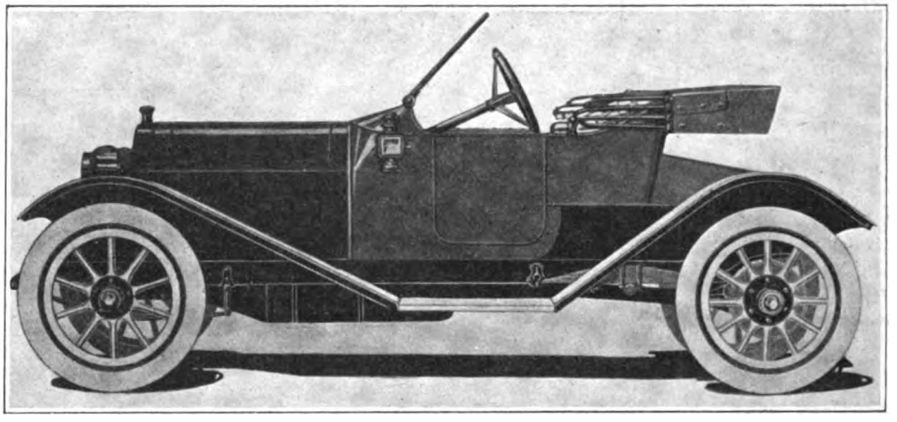
England's Imports Still Exceed Exports.

During the four months ending with April, the British exports of automobiles and parts increased from £1,021,597 to £1,136,352. During the corresponding period, the gross imports increased even more substantially—from £1,947,520 to £2,419,547.

NEW ROADSTER ON KING'S THRONE

Former Features Continued But Body Design Improves Appearance—Simplicity Chief Characteristic.

The prevailing tendency among manufacturers of motor cars to refrain from materially altering models that show no particular need of alteration, as opposed to the once general practice of making sweeping changes every year, is reflected in no uncertain way in the King roadster model for 1913. Though the new car really is an addition to the King line in that it has a body that differs from that of the 1912 roadster, and has a wheelbase that is shorter by five inches and is listed at a substantially lower price, all the original King features are present in a form that is unchanged. The rear spring suspension, in which each rear spring is attached by one end to the chassis, by the other to the rear axle and by the middle to the chassis again, is exactly as it was. It was the springing of the rear end of the King car that was chiefly responsible for the comment the machine caused upon its first show appearance at the Grand Central Palace last winter, and the makers, the King Motor Car Co., of Detroit, claim that the easy riding qualities of the car, due to this arrangement, leave nothing to be desired.



KING "36" ROADSTER IN ITS NEWEST FORM

While in a general way the new roadster is similar to the older car of this type, having a very sharply raked steering-wheel column, skuttle dash, big, sweeping mudguards and the compact appearance that characterizes a well designed roadster, there are a few body differences, chief among which is the building in of a rear compartment large enough to carry spare tires and touring impedimenta securely covered and protected from the weather; in the 1912 roadster the space behind the seat was divided between a big oval gasolene tank and a tool box. In addition to the tires, there is space in the rear compartments of the new car for two suit cases, or their equivalent. Both the appearance and the easy riding of the car are improved by the fact that the motor is set back eight inches from the front axle, which tends to distribute the weight in the most advantageous proportion.

As for the chassis, it is practically identical with the older models. There is the same 36-horsepower motor, with a bore of 3 13-16 inches and a long stroke of 5⅛ inches, with its four thermo-siphon cooled cylinders cast en bloc, dual ignition system, all the valve-operating mechanism enclosed, the valves set at an angle of eight degrees and operated by silent spiral gears, and the big two-bearing crankshaft, 2⅛ inches in diameter. There is the same power plant arrangement, the three-speed selective change-gears being enclosed in a housing that forms a unit with the crankcase and, incidentally, encloses the fly-wheel. Center control and left-hand steer are retained, together with the interlocking of the clutch with the service brake pedal, the disk clutch running in oil, the self-contained lubricating system, permitting oil which is put in through a breather pipe to circulate throughout the motor and change-speed mechanism, and direct shaft drive with the propeller shaft enclosed in a steel torque tube. The front axle is set at an agle of 7 degrees from the vertical, the idea being to present a stiffer resistance to road shocks and also to give a "castor" effect in the steering and to cause the wheels to incline, when turned, in the direction in which the car is being turned.

The wheelbase of the new roadster is 110 inches and the tread 56 inches; wheels are 32 inches in diameter and are shod with 3½ inch tires. The equipment supplied includes a mohair top with slip cover, windshield, acetylene gas tank and gas headlights, oil side and tail lights, horn and tools. Incidentally, the lamps are mounted in a steel tubular tie-rod which connects the front ends of the mud-guards; not only are the usual lamp brackets eliminated, but the tube serves as a gaspipe, having a connection to which the piping from the tank is attached. The finish of the body is in standard King colors, either red or green; all metal trimmings are finished in black and nickel.

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Census Statistics That Establish the Comparative Standing of the Chief Automobile-Producing States

		Number of establishments.	Persons engaged in industry. Total.	Proprietors and firm members.	Salaried officers, supts. and managers.	Clerks. Male.	Clerks. Female.	Wage earners. Number. Average number.	Wage earners. Number. Maximum month.	Wage earners. Number. Minimum month.	Wage earners—number Dec. 15, or nearest representative day. Total.	16 and over. Male.	16 and over. Female.	Under 16. Male.	Under 16. Female.	Primary horsepower.
Michigan—																
All industries	1909	9,159	271,071	8,965	8,031	16,183	6,393	231,499	De 250,078	Ja 211,679	.....	.....	....	...	...	598,288
Automobiles, bodies and parts	1909	113	28,098	29	518	1,628	479	25,444	Au 29,006	Ja 20,464	33,884	33,496	376	12	...	25,938
Automobiles, bodies and parts	1904	33	2,953	17	201	.....	.....	2,735	.....	.....	.....	.....	....	...	...	1,800
Ohio—																
All industries	1909	15,138	523,004	14,719	16,494	34,101	10,756	446,934	De 480,405	Ja 414,278	.....	.....	....	...	...	1,583,155
Automobiles, bodies and parts	1909	75	13,458	42	267	802	217	12,130	De 15,700	Ja 10,034	16,214	15,993	180	37	4	14,433
Automobiles, bodies and parts	1904	22	2,939	8	209	.....	.....	2,722	.....	.....	.....	.....	....	...	...	1,877
Rubber goods	1909	37	12,546	15	199	1,530	420	10,382	De 11,119	Ja 9,292	11,610	9,845	1,662	39	64	25,885
New York—																
All industries	1909	44,935	1,203,241	47,569	31,305	87,404	32,982	1,003,981	Oc 1,063,162	Ja 945,356	.....	.....	....	...	...	1,997,662
Automobiles, bodies and parts	1909	113	11,610	59	357	1,067	266	9,861	De 12,073	Jy 8,269	12,218	12,057	150	11	...	9,398
Automobiles, bodies and parts	1904	35	2,101	21	231	.....	.....	1,849	.....	.....	.....	.....	....	...	...	1,254
Indiana—																
All industries	1909	7,969	218,263	7,674	6,846	12,801	3,958	186,984	Oc 201,481	Ja 172,475	.....	.....	....	...	...	633,377
Automobiles, bodies and parts	1909	67	7,753	36	182	552	186	6,797	De 8,825	Ja 5,488	8,949	8,873	40	36	...	5,813
Automobiles, bodies and parts	1904	11	921	6	99	.....	.....	816	.....	.....	.....	.....	....	...	...	760
Wisconsin—																
All industries	1909	9,721	213,426	8,556	6,066	12,955	3,266	182,583	De 192,527	Ap 173,561	.....	.....	....	...	...	554,179
Automobiles, bodies and parts	1909	30	4,647	18	107	150	74	4,298	De 5,514	Ja 3,482	5,591	5,542	17	32	...	3,153
Automobiles, bodies and parts	1904	6	587	8	59	.....	.....	520	.....	.....	.....	.....	....	...	...	645
Illinois—																
All industries	1909	18,026	561,044	17,357	16,254	46,390	15,279	465,764	De 498,640	Ja 438,594	.....	.....	....	...	...	1,013,071
Automobiles, bodies and parts	1909	65	2,804	41	122	195	64	2,382	My 2,524	No 2,107	2,598	2,562	36	...	...	1,786
Automobiles, bodies and parts	1904	12	192	8	17	.....	.....	167	.....	.....	.....	.....	....	...	...	136

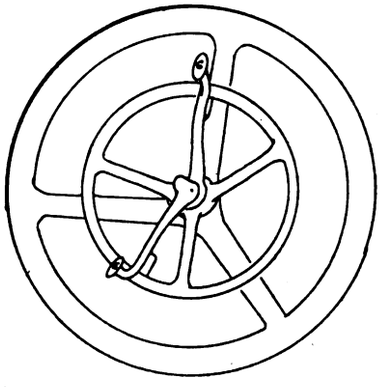
		Capital.	Expenses. Total.	Services. Officials.	Services. Clerks.	Services. Wage-earners.	Materials. Fuel and rent of power.	Materials. Other.	Miscellaneous. Rent of factory.	Miscellaneous. Taxes, including internal revenue.	Miscellaneous. Contract work.	Miscellaneous. Other.	Value of products.	Value added by manufacture.
Michigan—														
All industries	1909	$583,946,965	$591,296,389	$15,732,797	$19,137,417	$118,967,830	$16,824,150	$351,787,872	$1,671,665	$10,085,772	$3,397,011	$53,691,875	$685,109,169	$316,497,147
Automobiles, bodies and parts,	1909	52,926,297	77,168,738	1,130,784	1,439,111	15,490,755	531,063	53,351,358	99,328	185,038	78,061	4,863,240	96,651,451	42,769,030
Automobiles, bodies and parts,	1904	4,347,000	4,947,000	236,000	.....	1,268,000	.....	.....	.....	.....	.....	.....	7,997,000	4,554,000
Ohio—														
All industries	1909	1,300,732,732	1,282,845,511	33,755,010	38,392,489	245,449,904	50,117,773	774,084,174	4,913,712	24,499,586	6,717,474	104,915,389	1,437,935,817	613,733,870
Automobiles, bodies and parts,	1909	30,891,660	32,192,594	634,690	795,222	7,746,477	248,709	18,273,289	38,778	145,525	220,967	4,088,937	38,838,754	20,316,756
Automobiles, bodies and parts,	1904	4,226,000	4,424,000	254,000	.....	1,617,000	.....	.....	.....	.....	.....	.....	6,358,000	3,805,000
Rubber goods	1909	37,545,665	45,575,644	637,545	1,390,141	5,659,522	360,166	32,082,249	5,810	151,455	1,177	5,287,579	53,910,531	21,468,116
New York—														
All industries	1909	2,779,496,814	2,986,241,238	77,873,121	108,158,949	557,230,839	62,797,016	1,794,107,326	34,633,449	40,885,311	69,562,602	240,992,625	3,369,490,192	1,512,585,850
Automobiles, bodies and parts,	1909	25,102,473	27,364,888	863,733	739,801	7,016,306	256,504	14,651,598	272,763	47,781	2,873	3,513,529	30,979,527	16,071,425
Automobiles, bodies and parts,	1904	3,347,000	3,365,000	231,000	.....	1,227,000	.....	.....	.....	.....	.....	.....	4,260,000	2,353,000
Indiana—														
All industries	1909	508,717,197	525,060,079	12,429,228	13,875,447	95,510,616	17,376,845	316,997,908	1,286,365	28,893,427	2,145,858	36,544,385	579,075,046	244,700,293
Automobiles, bodies and parts,	1909	16,721,696	22,012,580	389,562	480,130	4,130,674	114,003	14,880,866	41,582	34,022	32,382	1,909,359	23,764,070	8,769,201
Automobiles, bodies and parts,	1904	1,194,000	1,320,000	80,000	.....	496,000	.....	.....	.....	.....	.....	.....	1,639,000	815,000
Wisconsin—														
All industries	1909	605,657,324	525,746,835	11,763,339	13,973,537	93,904,808	13,147,679	333,208,904	1,334,976	11,497,415	2,624,700	44,291,477	590,305,538	243,948,955
Automobiles, bodies and parts,	1909	8,745,869	9,540,256	236,340	206,793	2,732,951	79,110	5,261,104	8,231	31,952	78,286	905,489	11,440,242	6,100,028
Automobiles, bodies and parts,	1904	1,240,000	1,199,000	54,000	.....	300,000	.....	.....	.....	.....	.....	.....	1,875,000	1,030,000
Illinois—														
All industries	1909	1,548,170,701	1,733,327,352	38,128,166	53,320,948	273,319,005	48,194,400	1,112,732,290	11,153,257	57,023,503	13,625,794	125,829,989	1,919,276,594	758,349,904
Automobiles, bodies and parts,	1909	4,083,973	6,774,357	267,622	158,547	1,653,186	61,312	3,917,807	96,973	12,110	70,947	535,853	7,153,818	3,174,699
Automobiles, bodies and parts,	1904	401,000	247,000	28,000	.....	107,000	.....	.....	.....	.....	.....	.....	357,000	245,000

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POSITIONING THE SPARK AND THROTTLE LEVERS

Variety in the Manner of Arranging Engine Controls That Suggests the Problem Involved in Determining the Most Advantageous Location and Method of Operation—Over the Wheel and Under the Wheel Positions Contrasted—The Desirability of Standardization.

It scarcely is necessary to point out that some means of varying the speed of an automobile engine to suit the requirements of the driver—and the law—is necessary. Everybody who has ever driven a car or ridden in one knows that such things are necessary though it is doubtful if there are very many who appreciate the great diversity of control methods which obtains. And there probably are fewer who appreciate the wealth of thought and attention which can be put into the design of such contrivances in order to further simplicity of operation, while, at the same time, making the control of the car more or less an automatic function of the brain of the driver

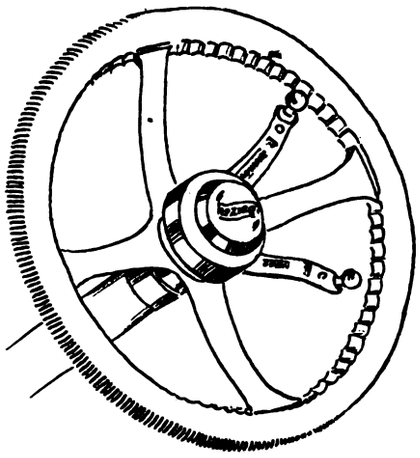


WINTON

rather than an operation which requires much premeditation.

Though it might appear on the face of it to be a very simple matter to evolve a satisfactory control system, there is a great deal more in the problem than appears on the surface; no greater proof of the correctness of the assertion can be had than variety in methods which exists. Years ago, when the automobile engine was to all intents and purposes a unispeed engine and a great deal more reliance was placed upon the change gear mechanism (of necessity) in order to obtain the various car speeds, little attention was paid to the engine controls which seldom were used except for starting and stopping. At that time throttles were set at a certain opening, and the spark was timed to occur at a certain time and the motorist jogged along with scarcely an appreciable variance in his speed; came a hill and a lower gear was used, the engine continuing in the even tenor of its way.

Needless to say, such things are different now. Flexibility has become a fetich, and the modern car is required to glide easily at four or five miles an hour or at 50 or 60 miles an hour without the necessity for using the change gear mechanism. Whether or not the requirement works out to the advantage of the machinery is an open question and is beside the issue. Suffice it to say "from 4 to 60 miles an hour

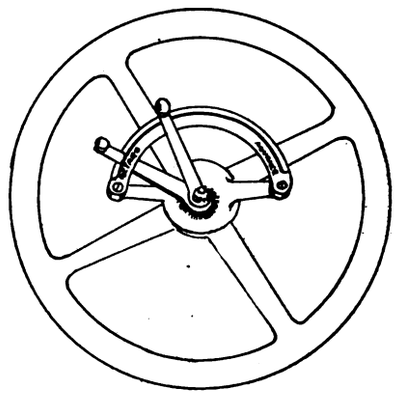


LOZIER

on high gear" has become the slogan of a by no means small number of manufacturers. That it marks a distinct advance in the science of automobile building no one can deny. At the same time, it makes imperative the perfection of such hitherto minor details as engine controls.

At first, spark advance and throttle controls levers were placed below the steering wheel. Preferably they were placed on the steering column, though in many instances they occupied more inaccessible places on dashes and on the sides of the driver's seat. As has been stated, the principal reason for their relegation to positions of comparative obscurity resulted from their infrequent use. But another reason which probably had as much bearing on their location as anything else was that mechanism of all kinds had not reached the state of perfection attained in later years and a multiplicity of rods, gears, bell cranks, etc., was more likely to increase the inaccuracy of the apparatus and thus reduce its value as a positive means of control.

Later, when engineering science had advanced a couple of pegs and the requirements for more frequent changes in engine speed became more urgent, controls gradually were shifted from the steering column to the top of the steering wheel, where they were within easy (?) grasp of the driver's fingers. At present, the top of the steering wheel is the preferred position, judging from the percentage of manufacturers whose levers are so placed, and though the location has much to commend it, there are many things which must be thought out before the final application can be made with any assurance of satisfactory results accruing. Those manufacturers who place their levers below the wheel on the steering column are in the minority, though this location, viewed in certain lights is the more advantageous. Like the other, however, much thought and attention to apparently minor details is nec-



ALCO

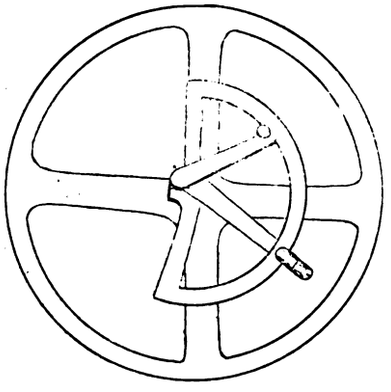
essary if the arrangement is to prove a help to the proper management of the car and not a hindrance and the possible source of much trouble.

Theoretically, the engine controls should be so located that their operation requires the minimum of effort on the part of the driver. When so placed they encourage their intelligent use and at the same time reduce the premeditation neecssary to their operation to the minimum; in other words, their use, through continued practice, becomes almost automatic. Following the same line of thought, there can be no doubt but that the intelligent use of spark and throttle levers will increase the all-around efficiency of the car and conduce to the longevity of the engine and every other part. In this respect, it is unnecessary to dilate upon harm which may be done by improper spark timing—the knocking and pounding and general racking which will result. And yet there is not a single manufacturer who indicates on his spark lever quadrant even approximately the proper position for normal running, though

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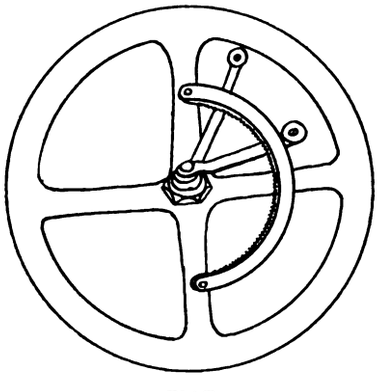
manifestly it would be simple to do so; merely filing a small notch, deeper than the usual row of serrations, would suffice, and would entail an extra production expense so small as to be practically negligible.

As a matter of cold fact, there are very few manufacturers who place marks upon their levers to indicate which is which, and it is altogether likely that at least some



MERCER

of the accidents which have happened can be traced directly to this lack of forethought. Here, too, the remedy is simple—if the levers are cast, which in a great many cases is true, the remedy is even simpler, and if they are machined they can be marked effectively with a small hand die and a hammer. The necessity for such marking is made still more imperative by the lack of standardization which obtains. There scarcely are two cars on the market which have control levers arranged exactly alike, and even though it is necessary for the purchaser of a new car to learn his con-

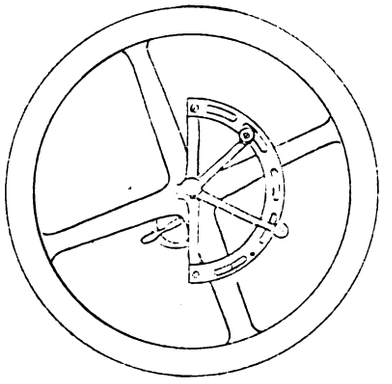


FIAT

trols anew, the task would be rendered immeasurably simpler if the levers were marked "S" for spark and "G" for gas.

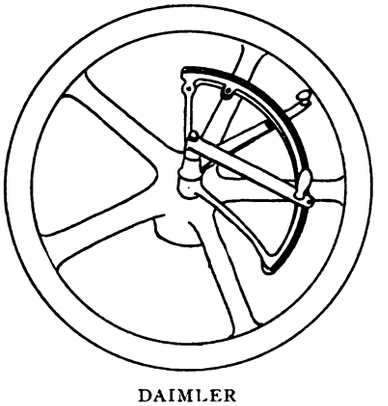
That there really is necessity for at least partial standardization of the levers there can be no doubt. Of course, it is reasonable to expect that the first time a driver attempts to operate a new car he will (if he is careful) lift the hood and ascertain which of the levers controls the spark advance and which controls the throttle. But there is the chance that the controls of the new car may be so like those of the old car in appearance as to engender the supposition that they are alike in operation as well, whereas, as experience goes to prove, the levers may actually be reversed, the spark lever being the throttle lever, or vice versa, or the direction which they must be moved in order to open the throttle or advance the spark may be just the reverse.

Arrangements which are similar in appearance but which are totally dissimilar in operation are fairly common, and of themselves suggest that there is room for standardization. Naturally, it is unreasonable



KNOX

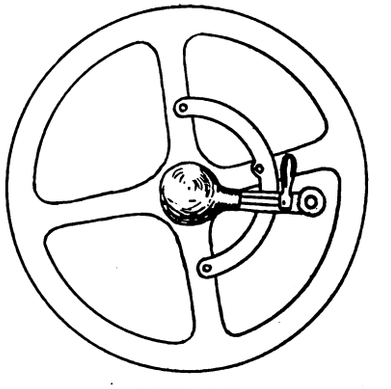
to expect that every manufacturer should adopt a certain form or type of levers, for each has his own particular reason for using the type he employs, but it would seem within the pale of possibility to standardize the direction in which the levers must be moved in order to obtain the effect de-



DAIMLER

sired. For instance, all throttle levers might be so arranged that their movement away from the driver would open the throttle, or vice versa. This in itself would be a big step in the right direction, and undoubtedly would tend further to increase the popularity of driving, in that it would materially increase simplicity of control. As for the spark lever, practically the same method of standardization of movement might be adopted, i. e., movement from the driver would advance the spark, or vice versa. The position of the lever on any car then would be proof positive that the spark was either advanced or retarded. In other words, to "open up" might be made to mean more exactly what the phrase usually signifies.

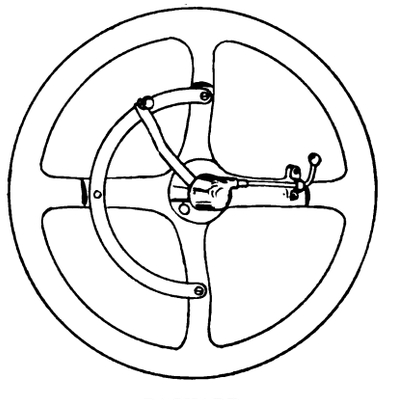
The Winton Motor Car Co. is among the few—the very few—manufacturers whose control levers are labelled so that there can be no mistake as to which is which. The arrangement is shown by the accompanying sketch, the spark control lever having an "S" cast in the finger button and the throttle lever being similarly marked with



PEERLESS

a "G" for gas; no indication of which way the levers should be moved to open the throttle or advance the spark is given, however. The arrangement is further distinctive by reason of the fact that the "quadrant" is not a quadrant at all, but is a complete circle. Another distinctive feature is that the circle is "notchless," which is to say, the serrations which generally are employed to assist in holding the levers in positions are missing.

It is an open question whether serrations really are an advantage, anyway. Of



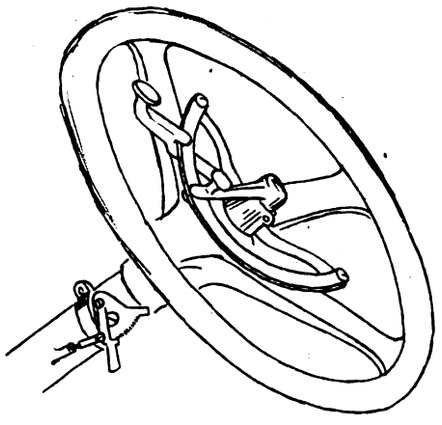
PACKARD

course, some means of holding the levers in position must be provided, or road vibration soon would throw adjustments out of kilter. But it not infrequently happens that some adjustment of the throttle lever, for instance, between two of the serrations becomes necessary; to move the lever forward one notch may permit the engine to run too fast, and to move it back one notch may not permit it to run fast enough. It is here that the notchless quadrant scores, for with it any adjustment of the levers

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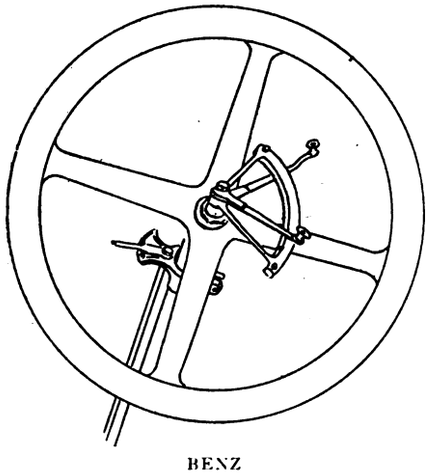
can be obtained; the levers can be moved the smallest fraction of an inch, if necessary, and will maintain their positions. Where notchless quadrants are used, the friction between the moving parts alone is relied upon to hold the levers in their respective places.

The Lozier car is another in which the control levers are plainly marked for the



NATIONAL

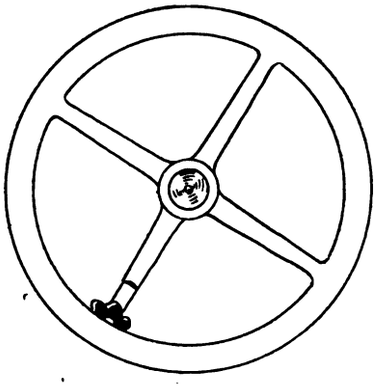
guidance of the driver. In this case the marking is supplemented by arrows which indicate the direction in which the levers must be moved to open the throttle and to advance the spark. The method of marking is shown quite clearly in the sketch. The spark advance lever is the upper one and is farthest from the driver, the reason being that it is used less frequently and perhaps only at long intervals, as when the engine is stopped or started. Another feature of the Lozier arrangement which is common to the Winton and to several others is that



BENZ

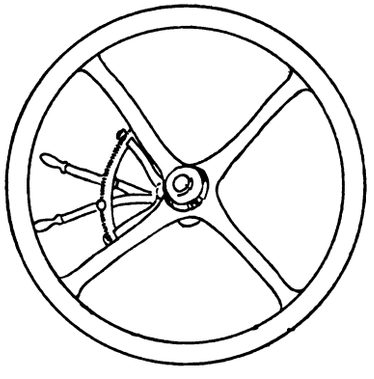
the position of the levers remains the same, regardless of the angle at which the steering wheels are turned. That is to say, the "quadrant" and levers remain stationary and do not turn with the steering wheel.

As to whether the levers should turn with the steering wheel or not is another questian upon which there is much variety of opinion. Of course, where the levers turn with the wheel their relationship to the driver's hands remains unchanged as long as he does not shift his hands on the wheel. This may be an advantage for normal driving, as when the steering wheel is turned only slightly, and it is not necessary for the driver to shift his hands around the periphery of the wheel. Under such circumstances, the throttle lever button may repose indefinitely in the driver's fingers and the throttle opening may be varied at the same time the steering wheel is turned and without the necessity for removing either hand from the wheel.



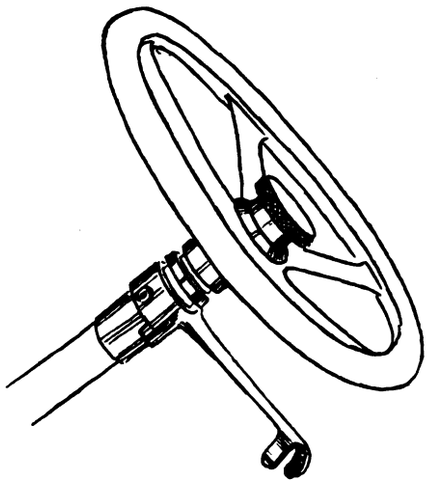
S. G. V.

But where a car continually is driven around corners or to one side of the road to pass other vehicles, as in congested traffic, for instance, the stationary quadrant and levers may be more of an advantage than the movable ones. Manifestly, it is uncomfortable, to say the least, to maintain a tight grip on a steering wheel and turn it more than one-quarter revolution. The



PIERCE-ARROW

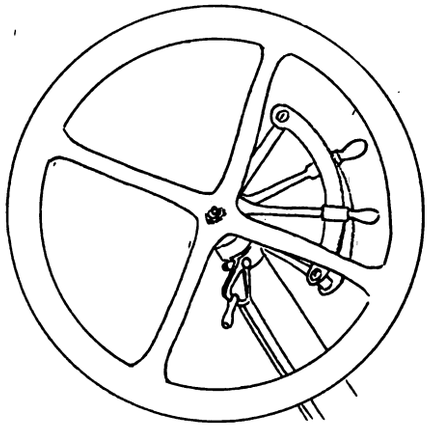
most natural thing to do, and the thing that is done most, is to use only one hand to turn the wheel, which is permitted to slip through the other. Thus, for instance, in turning a corner to the right, both hands are employed to start turning the wheel to the right. When the vehicle has started to turn, the effort required to turn the steering wheel decreases and the right hand then is relied upon to complete the operation, the wheel slipping through the fingers of the left hand. Which brings out the point that the grip of one hand, at least, has been loosened from the wheel. And as that hand temporarily is unemployed, it naturally follows that it could be used to operate the throttle lever, if necessary. But if the levers and quadrant are fast to the wheel and turn with it, the driver then will be required to stretch to reach the controls. Where the levers are stationary, on the other hand, their position becomes automatically registered in the brain of the



RENAULT

driver, and he never has to stretch to reach them.

All of which assumes, of course, that the throttle lever regularly is used to control the speed of the engine. Latterly the accelerator, or foot throttle, has come in more general use, and the art of controlling a car by means of the hand throttle has been more or less lost. The word "art" in this connection is used advisedly, for it assuredly is an art properly to control



STODDARD-DAYTON

a car with a hand throttle. To use the hand throttle properly and the way it ought to be used may require a longer tuition, but the end will justify the means, for there will be less likelihood of accident due to inadvertently "stepping on the accelerator" and the car as a whole will be benefited by reason of the more careful acceleration which is encouraged and the absence of jerks and jars occasioned by the prodding

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the accelerator sustains under the weight of the operator's foot, which is jounced up and down by road vibration.

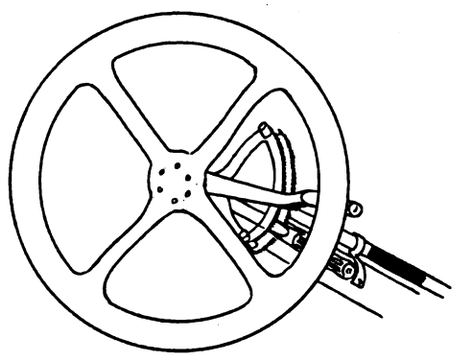
But even though the accelerator is more generally used than the hand throttle, that very fact makes it more imperative that the positions of both that lever and the spark control lever be standardized insofar as possible. Then when it becomes necessary to use them either in an emergency or through choice, there will be less likelihood of confusion and the accidents which almost invariably result. At the least, the directions in which the levers should be moved to open the throttle or to advance the spark should be indicated in some way, and the ease with which it might be done suggests that some day the practice may be more general.

In the Alco arrangement the retard and advance positions of the spark control lever are indicated on the "quadrant," the word quadrant in this connection being a misnomer, of course, in view of the fact that the levers are supported on a semi-circular segment. The use of the word quadrant has become general, however, regardless of the number of degrees represented by the supporting segment, whether it be a quadrant in fact, a semi-circle or a complete circle. The levers in the Alco arrangement are slightly longer than is indicated in the picture and are held in position by friction, there being no notches in the segment. The longer lever operates the throttle, and comes within easy grasp of the operator's fingers, and the segment does not turn with the steering wheel. The Mercer arrangement is quite similar, the segment being notchless and the longer lever controlling the throttle opening.

Engine controls on the Fiat cars also are arranged on the top of the steering column, though the arrangement differs from those that have been described in that the segment is fast to the steering wheel, with which it and the levers move. The longer lever controls the size of the throttle opening and comes even closer to the inner rim of the steering wheel than any of the others. The segment is notched, the notches in the levers being maintained in mesh with those in the segment by the spring in the levers, which are flexible. In the Knox arrangement is illustrated one of the variances to which attention has been drawn. Inasmuch as in the majority of cases the throttle control lever terminates nearer the steering wheel rim than does the spark lever, it might be supposed from a cursory examination that the arrangement of the Knox levers followed the general practice. Such is not the case, however, the longer lever controlling the spark advance and the shorter lever controlling the size of the throttle opening. The smaller lever shown in perspective just below the main controls is the ignition switch.

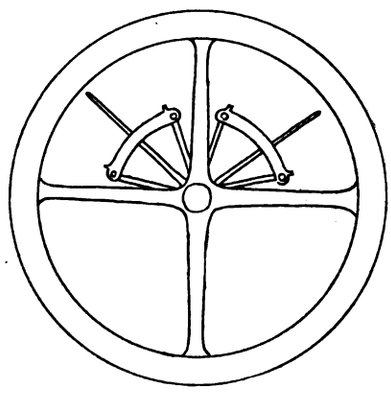
As a general rule, foreign practice differs but little from that which obtains in America. In the majority of cases the levers are placed on top of the steering column and there is just the same surprising amount of variety in evidence as there is in American practice. In the English Daimler cars, for instance, the levers are rather more cumbersome than is usual, and are arranged on a quadrant fastened to the steering wheel, the shorter, or inside lever controlling the throttle opening and the longer lever controlling the spark advance.

In both Peerless and Packard cars, the



OLDSMOBILE

arrangement of the levers is unique and is different from all others. In each case, the throttle lever operates on a notched semi-circular segment which is fastened to and moves with the steering wheel. The similarity is carried still further, in that the spark control lever in each case moves in a vertical instead of a horizontal plane, the arrangement of the levers being best made plain with the aid of the accompanying



MITCHELL

pictures. The Packard spark lever is separate from the throttle lever and is mounted on one of the spokes in the steering wheel. In the Peerless arrangement, however, the spark lever is mounted directly on the throttle lever with which it moves.

Improvements in carburetter design have accorded air and gasolene adjustment levers a legitimate place in proximity to the other controls, and they are to be found on not a few cars. On National cars, a small supplementary lever is placed on the steering column directly below the steering wheel, where it is within easy reach of the driver. Its purpose is to permit quick adjustment of the amount of auxiliary air admitted to the carburetter, the control being by means of a Bowden wire. The main control levers are orthodox in that the longer one controls the throttle and the shorter one the spark, the segment and levers remaining stationary. A similar arrangement is used on Benz cars, with the difference, however, that the supplementary lever controls the amount of gasolene in the mixture by altering the position of the needle-valve. The segment and levers are similar to those that have been described, the segment being notched and remaining stationary with regard to the movements of the steering wheel.

Of course, where the fixed spark system of ignition is employed—and there would seem to be a revival of interest in the system—the spark advance lever is not necessary and the simplicity of the controls is further increased. S. G. V. cars, for instance, are minus the usual spark advance lever, and the control is still more distinctive by reason of the employment of a unique type of throttle lever. S. G. V. cars are of the type in which the driver is expected to place greatest dependence upon the foot throttle, and for this reason no particular effort has been made to supply a hand throttle which shall be adapted for continual use to the exclusion of the accelerator. In its simplest aspect, it is merely a small knurled knob at the extremity of a rod supported by one of the spokes in the steering wheel. Its utility consists chiefly in maintaining a setting of the throttle for long distance runs, during which wide variations of engine speed are unnecessary.

Renault cars, which as everyone knows are of French extraction, also are among those in which fixed ignition is used and the spark advance lever is eliminated as a matter of course. Similarly, the driver is expected to place greatest reliance on the foot throttle, and for this reason the hand throttle serves merely to maintain an arbitrary setting for long-distance touring. The lever itself is located below the steering column. At the top of the steering column and directly in the center of the wheel there is a knurled knob by means of which the auxiliary air to the carburetter may be varied to suit the requirements of the engine, the knob being rotated to the right to admit more air and to the left to decrease the supply.

The number of manufacturers who place their spark and throttle control levers below the steering wheel on the steering column is very much smaller than the number who place them atop the steering wheels, though as already has been pointed out, the arrangement has many advantages. In the first place, their location below the wheel reduces to the minimum the chance of the position of either being altered by careless or hurried manipulation of the wheel, as when making a quick swerve to avoid collision, for instance. Furthermore, they are stationary of necessity, and if properly located may be reached with the

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least possible effort on the part of the driver.

Pierce-Arrow levers are arranged below the steering wheel on the steering column and are an excellent example of good location resulting from well thought out design. For a number of years Pierce-Arrow cars were not equipped with foot throttles, and the hand throttle was designed for continual use. For this reason it was placed fairly close to the rim of the steering wheel, and because the gear shift levers required to be operated by the right hand, it was located at the left side, to be manipulated by the fingers of the left hand. The spark advance lever, which is used less frequently than the throttle lever, is directly below the latter, both being supported on a small notched quadrant. In many ways, Stoddard-Dayton practice is similar, the difference being, however, that the quadrant is placed at the right side of the steering column. As in the case of the Pierce-Arrow arrangement, the throttle lever is uppermost and is intended to be operated by the driver's fingers as his hand rests on the wheel. Supplementing the main controls, a small lever serves to permit variations of the air content in the mixture.

In the Oldsmobile arrangement, the quadrant also is located below the steering wheel at the right side, though by reason of the distance of the throttle lever from the wheel rim, difficulty might be experienced in manipulating it without removing the right hand from the wheel. In this arrangement, the spark control lever is uppermost, and therefore is closest to the wheel, the throttle lever being below the other. A method of altering the supply of auxiliary air to the carburetter also is supplied, and is in the form of a sliding sleeve which fits over the control rods. To increase the supply of air to the carburetter the rod is slipped downward and is held in place by friction between the steering column and a projecting finger attached to the top of the sleeve.

Mitchell levers also are placed below the steering column, though the arrangement differs from all the others in that separate quadrants are used for each. As is usually the case, the throttle lever is at the right side and is sufficiently long to be manipulated by the driver's fingers without the necessity of his removing his hand from the steering wheel.

Copper, brass, German silver and, in fact, nearly all moderately soft metals become harder and less ductile after being hammerred, drawn or in any way subjected to much pressure or friction. For this reason anything made of these metals should be annealed after working.

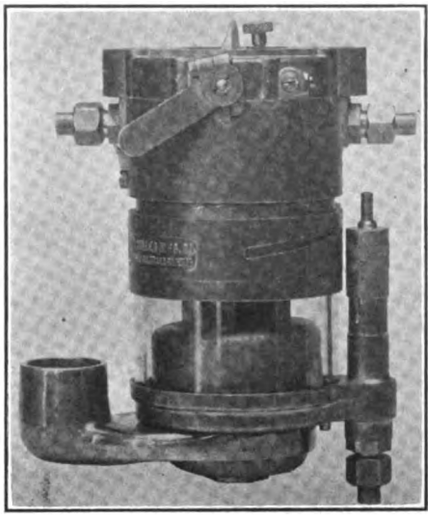
A machine screw that is very hard to turn out should be handled with some care, because there is danger of breaking off half the head, which would necessitate drilling out the shank. The screwdriver used should fit well and be held squarely.

MILLER CARBURETTER "ARRIVES"

That Is, It Arrives in the East—Absence of Spring-Controlled Valves Its Principal Feature.

After having been on the California market for several years, and although it is not wholly unknown in the East, the Miller carburetter, owing to recent organization of the New-Miller Carburetter Co., in Indianapolis, Ind., is in a fair way of acquiring national repute. The Indiana factory now is in operation, and with minor refinements is producing the Miller in the form in which it has been best known on the Pacific Coast.

The chief characteristic of the carburetter



NEW-MILLER CARBURETTER

is the absence of springs and spring-controlled valves; all valve movements are positive, the arrangement being such that the valves are opened in fixed proportion to the size of the throttle opening, and all are susceptible of adjustment. Another of its distinctive features is that the needle-valve opening can be regulated from the driver's seat while the car is in motion.

The body of the new Miller carburetter is in the general form of a vertical cylinder; the glass float chamber is at the bottom, the auxiliary air valve in the middle and the throttle and mixing chamber at the top. The throttle is interconnected with the auxiliary air valve and also with the needle-valve lifter, the result being that, as the throttle is opened, the needle-valve is raised and more gasolene permitted to flow, and at the same time the auxiliary air valve allows the entrance of more air; the relative movements of all three are closely adjustable, and the needle valve lifter itself has three separate adjustments—for low, intermediate and high speeds, respectively. The auxiliary air valve is of the piston type, rising, as it opens, and uncovering annular air ports in the walls of the valve chamber. The volume of auxiliary air admitted is susceptible of regulation by means of a spirally turning sleeve, which increases or decreases the width of one of the annular ports, its movement being limited by a stop.

In addition to the controlling devices on the carburetter itself, there is a Bowden wire control, from the steering wheel column, of the needle-valve lift, so that once the various functions have been properly adjusted for relative action, the mixture can be made richer or leaner throughout the whole range of throttle movement by the movement of the lever connected to the terminals of the Bowden wire. The lever can, of course, be placed at any desired position, but the steering wheel column would seem to be the most convenient. The seat control of the needle-valve is a feature that is of no little service in a hilly country, for the needle-valve can be shut tight and the car allowed to coast with pure air passing through the motor.

The carburetter as a whole is of such shape that no great amount of space is required for its installation, and if the hot air intake, which is fitted to each instrument, is used it can be turned horizontally almost in a complete circle. If not needed, the hot air attachment can be left off altogether. Heat can be supplied to the mixture by means of the hot water jacket around the mixing chamber, though, like the hot air intake, its use is optional. It is claimed by the manufacturers that the new carburetter is extremely efficient, largely because it operates on a vacuum that is approximately 50 per cent. less than the vacuum ordinarily used in carburetters.

Fuel Tank Forms Back of Seat.

Elaborating somewhat on the idea involved in positioning the fuel tank in a deep skuttle dash, while still retaining many of the advantages of the system, a British manufacturer locates his fuel supply in a removable tank built in at the rear of the front seats and in the tonneau. The tank thus occupies space that seldom is utilized, while at the same time it is perfectly accessible and is less liable to accidental injury than is the case when it is located on the dash. Incidentally, the location permits the tank being placed higher than is possible in any other position and thus ensures a good "head" of fuel at all times. The tank is shaped to fit the body, of course, and the unnually necessary coat and robe rails are fastened to its casing, thus not altering the usual tonneau arrangement.

To Lengthen Life of Timer Contacts.

Very little of the wear which occurs on the contacts of a timer where battery and coil ignition is adhered to is caused by friction of the moving parts. The rapid deterioration results from the burning action of the sparks formed each time the circuit is broken. The life of a timer can be greatly increased if a condenser of suitable capacity is bridged across the contacts when the sparks which emanate from the back kick from the primary coil each time the circuit is broken, will be practically eliminated.

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MOTOR AERIALS MARVELS OF SPEED

Gas-Electric Hook and Ladder Trucks Installed in New York—Fifteen Seconds Raising, Four Lowering.

New York City's already formidable equipment of motor-propelled fire fighting apparatus was increased on Monday last, June 17th, by the installation of two 75-foot aerial ladders, the combined product of the Couple-Gear Freight Wheel Co., of Grand Rapids, Mich., and the Webb Co., of St. Louis, Mo., and which include some new features. After successfully passing the customary preliminary tests, the big trucks were installed, one at the headquarters station on East 67th street, and the other at No. 6 station, on Canal street. Both already have seen active service.



NEW YORK FIRE DEPARTMENT'S NEW GAS-ELECTRIC LADDER TRUCK

The machines are exactly alike, and are of the gas-electric type that the Couple-Gear company has evolved, with four-wheel drive, the wheels being of the familiar disk type peculiar to the vehicles of this concern, enclosing each an electric motor. Owing to the fact that there is no mechanical connection between the motor and the wheels, the gasolene motor, which is a Herschell-Spillman four-cylinder machine of 50 horsepower, is placed well back of the front wheels—in fact, it was located just where it was most convenient to put it—and the current generated by the direct-connected dynamo is carried to the controller on the front of the seat, from which it is distributed to the four wheels. Steering is effected by means of two wheels, one handled by the driver in the usual motor car style, and the other by the rear tillerman, who sits over the rear wheels—the orthodox ladder truck fashion. Though weighing fully ten tons with the crew on board, a speed of 25 miles an hour can be attained on level road, and any grade in the city ascended. One of the preliminary tests called for the ascent of the terrible "Duffy's Hill," on Lexington avenue at 101st street, which usually is shunned by all vehicles.

Particularly interesting is the method of hoisting the ladder, which is in two sections, as is usual in such apparatus—the "bed ladder," 40 feet long, and the "fly ladder," 35 feet long. Advantage is taken of the fact that there is plenty of electric power available by installing an electric motor which, through suitable gearing, hoists the ladder into position. A pair of heavy auxiliary springs help by taking off some of the dead weight and also relieve the shock if the ladder is dropped rapidly. The bed ladder can be brought to a vertical position in four seconds and the whole ladder extended to its limit in 15 seconds. There is a small separate rheostat for the hoisting motor and a separate throttle for controlling the engine which drives the generator, from the ladder platform.

The ladder is mounted on a rotating turntable. So great is the stability of the truck, largely owing to the fact that the wheels containing the motors are of considerable weight, that the bed ladder can be extended at right angles to the truck and with two men perched on the outer end hoisted from a horizontal to a vertical position without in the least disturbing the equilibrium of the machine. When the ladders are to be hoisted, the tillerman's seat at the rear is swung sideways clear of the ladders and the rear steering wheel is removed from its shaft.

The wheelbase is 24 feet and the overall length, from the bumper in front to the projecting end of the ladder in the rear, is 46 feet. The usual equipment of ladders, life nets, axes and other tools is carried

Water Level Important for Cooling.

While there can be no doubt of the efficacy of the thermo-siphon system of water circulation to maintain an engine at the proper temperature, there is one very important point which should not be overlooked or there will be neither circulation nor cooling. It is simply that there must at all times be sufficient water in the radiator to immerse the outlet from the cylinders. Advice to the effect that radiators should be refilled at regular intervals is not as necessary where positive pump circulation is maintained, though in systems of the other kind there can be no siphonic action unless the water in the radiator is maintained at the proper level.

How Too Much Powder Does Harm.

While it is quite generally known that the use of a little talc or French chalk between the inner tube and the casing acts as a sort of lubricant and prevents chafing, one of the experts of the Michelin tire company brings out the fact that it is not so generally appreciated that too much of this substance is likely to cause punctures by gathering in lumps and wearing and weakening the soft rubber of the tube. Too little talc, of course, will permit sticking and chafing.

Loose Cylinders and Their Prevention.

A motor that is subject to considerable vibration is liable to have its cylinders work loose on the crankcase through the loosening of the holding-down bolts or nuts if they are not watched. A wrench should be applied occasionally to make sure that everything is tight. The troubles that arise from loose cylinders run all the way from leakage of oil to a wrecked motor, skipping very few of the many intermediate evils.

Threads in Aluminum that Require Care.

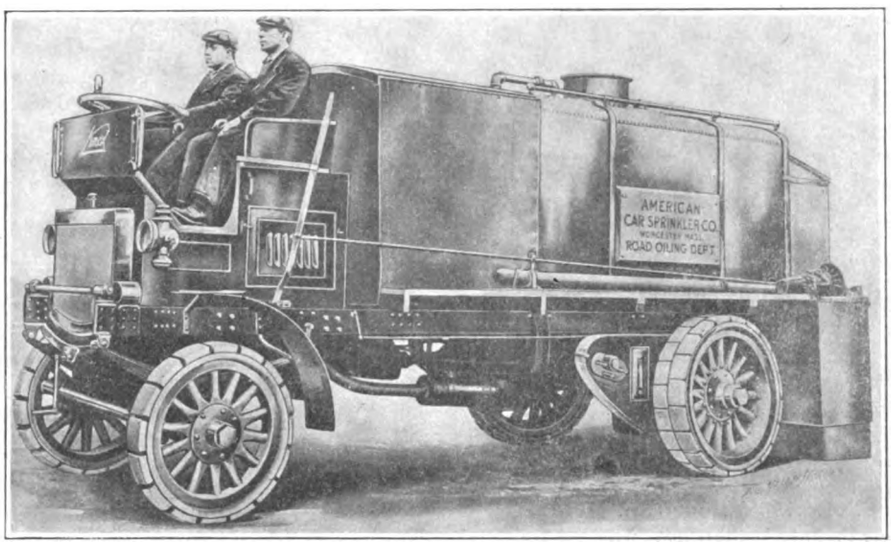
Threads cut in aluminum will not stand the same strain as will threads cut in iron or bronze, for instance, and therefore care should be taken not to apply too much force to screws or studs in parts which are made of aluminum.

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OIL SPRINKLER KNOX'S LATEST

Distributes 1,200 Gallons of the Fluid Under Pressure from Power Pump—Tires Amply Protected from Oil.

If there is any one feature that is more conspicuous than another in the work of the Knox Automobile Co., of Springfield, Mass., it is the surprising variety of purposes for which its commercial vehicles are designed. The newest production, the huge vehicle shown in the accompanying illustration, is a good example; it is a specially designed oil-spraying wagon for use in treating roads with crude oil—a method of road preservation that just now is in high favor with engineers.



KNOX 1,200-GALLON OIL SPRINKLING TRUCK FOR ROAD WORK

The big Knox oil spraying machine carries a tank having a capacity of 1,200 gallons. The simplest method of oil distribution—by gravity sprinkling, as water is sprinkled by the good old-fashioned sprinkling cart—does not give the best of results, because the oil is apt to flow sluggishly if the outlets are small and too fast if they are large, and in any case the useful but somewhat disagreeable liquid has a way of collecting and remaining in the hollows, doing more harm than good. The latest idea, as embodied in the new Knox machine, is a power pump, driven direct from the transmission shaft, forcing the oil through a large number of small spraying orifices in the rear. The pump can be stopped and started from the driver's seat and the rate of speed can be governed also. The tires of the rear wheels are protected from the oil—which, of course, would have a deleterious effect on the rubber—by a sheet metal fender extending the whole width of the car and reaching, with its flexible skirt, practically to the ground.

The chassis is of the chain-driven type, with chains completely enclosed. The driver's seat is mounted high above the road, and the motor is housed under it and the footboard; the radiator is in the usual forward position, with the dashboard above it and practically in the same vertical plane. The motor, control, change-speed gear and other details are of the well known Knox standard type. The wheels are of wood, shod with block tires, single in front, while the equipment on the rear wheels is of the dual type.

Makes Automobiles Collect Own Dust.

Reviving an old, old idea which at various times has caused inventors to scratch their heads and to dream of untold wealth, a British engineer hailing from Manchester just has patented a device which, it is claimed, will collect the clouds of dust raised by automobiles and thus eliminate for all time one of the discomforts of motoring. In its simplest aspect, the device consists of two conduits and a small box. The conduits are funnel shaped at their extremities, which are arranged near the rear of the wheels, and as the dust rises it is induced to enter the pipes by means of the air pressure generated by the moving car in the pipes themselves. An alternative method suggested is to supplement the system with a small centrifugal exhaust fan to draw the dust into the conduits. The dust collected is discharged into the box, the latter being emptied by means of a lever near the driver's seat. No provision is made for collecting the dust that is raised when the box is emptied of its contents.

Portable Vise for Emergency Work.

Among the most convenient things that can be carried on long trips is a small vise that can be clamped to the running board. It is true that such a vise sometimes is carried, but its value is not appreciated as it should be. Often it can save hours of time—if not the situation.

GOLDEN DREAM OF SPRING WHEELS

Promoters of Berntson's Patent See Millions Ahead—Makers to be "Compelled"—Gorgeous Plans Outlined.

"Doctors and other busy men who drive their own cars" and who are seeking a "boon" can find it in Washington, D. C., where so many other things are to be found; it is the Berntson spring wheel. "In due time," it is the intention to "compel the automobile manufacturers to recognize the value of the Berntson wheel as a necessary commodity in connection with the automobile industry." The Berntson Spring Wheel Co., of Washington, D. C., proposes to do the compelling; it says so itself in a spread-eagle advertisement. Meanwhile, the "doctors and other busy men" can obtain the wheel in either "cushion suspension" or a "wishbone" pattern.

Meanwhile, the doctors and other men, busy or otherwise, who desire to obtain part of the fortune which lies in the Berntson wheel will have no trouble whatever in booking their orders for Berntson shares. The extent of the fortune is not easily measured. For, take it from the advertisement, signed by J. Worth Carnahan, director of agencies, "the automobile business is still in its infancy." That remarkable discovery is not original with Carnahan, but as convincing proof of its correctness he respectfully submits that there were produced last year only 180,000 cars, valued at $240,000,000, and yet there was spent for horses and mules the stupendous sum of $2,902,238,000, which even J. Pierpont Morgan will admit is no insignificant sum. Also take it from Carnahan, "there have been some prodigious fortunes already made in the automobile industry." As evidence, he parades that worm-eaten "chestnut" that Walter E. Flanders started in the automobile manufacturing business with $195,000 and in 20 months sold out for $6,000,000, a profit of nearly 3,000 per cent.—which, since the day the husk fell off the chestnut, has caused Flanders diligently to seek for the five million and odd dollars that evaporated somewhere in the process of transmission to his purse.

Carnahan quotes some other equally convincing profits and figures to prove that "twenty times as much business as has been done" is possible; in fact, he is so uncommonly astute in discovering profits and prospective profits that how the 13,000 spring wheels that repose in the United States patent office escaped him is one of the mysteries of the situation. For, if you will, just gaze on these two additional pictures which hang in the Carnahan-Berntson art gallery:

"According to reliable statistics, there are at the present time in actual use in the United States alone over 500,000 automobiles, and it is certainly safe to presume

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that at least 10 per cent. of the owners of these automobiles will be obliged to buy new tires and inner tubes during the coming year. This is a very conservative estimate, and the Berntson Spring Wheel Co. proposes within the very near future to be in a positoin to equip at least one-half of this number of automobiles with their patent spring wheels, in connection with any style of standard tire desired, which would mean that not less than 25,000 owners of automobiles, at the end of the second year of the company's existence, will be using the Berntson spring wheels, and that the sale of said wheels during the year, viz., four wheels to each automobile, will represent a total sale of at least 100,000 wheels, at an average profit of not less than $5 for each wheel, or a total profit of $500,000, or 25 per cent. on the par value of the entire capitalization of the company."

"The practicability of the Berntson Steel Wheels herein illustrated has been proven beyond the possibility of a doubt by their actual use during the past nine months, principally in the city of Pittsburgh, Pa., the home of the steel industry in this country, and where a number of prominent stockholders and trustees of the company reside.

"Any one who is familiar with the hilly, congested and roughly paved business streets of Pittsburgh and Allegheny, where the wheels herein portrayed have stood the test of endurance by actual daily use for demonstrating purposes for about five months, will readily agree that a wheel that will hold up and give entire satisfaction in the cities of Pittsburgh and Allegheny will prove satisfactory in any other city in the United States; therefore, the company's reason for the claim that the Berntson Steel Wheel will be generally accepted as a practical and very essential commodity in connection with the automobile industry."

After selling its preferred stock, the Berntson company will "equip and maintain factories and establish initial assembling shops and sales agencies," after which. by the sale of its common stock, it will "extend its sales agencies and assembling shops as rapidly as possible to all the principal cities of the United States and foreign countries." Apparently, when this small undertaking is accomplished, the stockholders will begin to clip coupons.

In addition to Carnahan, who is described as president of the Carnahan Press, the Berntson Spring Wheel Co. consists of W. F. Gude, president, and who holds the responsible office of "U. S. Government Representative of Society of American Florists and Ornamental Horticulturists"; Thomas A. Berntson, inventor and mechanical expert; also two physicians and surgeons, two members of a heating company, one expert public accountant, one political writer, one contractor and builder, and one hotel proprietor.

Only a limited number of shares of the preferred stock are for sale.

FRANKLIN CAR HAS A BIRTHDAY

Sunday Air-Cooled Leader Will Be Ten Years Old—Structural Features Retained Throughout Manufacture.

According to the record of events that make automobile history, it was just 10 years ago next Sunday—June 23d, 1902—that the first Franklin air-cooled automobile was sold. And inasmuch as the event marked also practically the birth of the commercially possible air-cooled automobile, it is not strange that the present efficient organization of the H. H. Franklin Mfg. Co., of Syracuse, N. Y., which is



FIRST FRANKLIN CAR PRODUCED

one of the direct outcomes of that first sale, should celebrate the anniversary.

S. G. Averill of New York was the man who purchased the first product of the Franklin factory, and there was no lack of persons to scoff at the little roadster that had cost him the neat sum of $1,200. It was a four-cylinder seven-horsepower car with the motor set crosswise in the frame, and scarcely presaged the modern four- and six-cylinder cars that glide smoothly over the roads to-day. Nevertheless, it ran, and doubtless earned its keep. It was in 1901 that John Wilkinson, who at present is its consulting engineer, became connected with the H. H. Franklin Mfg. Co., which then was devoted to the production of die cast parts. Shortly afterward the first experimental car made its appearance and was put through a course of sprouts. Later, designs were refined and plans laid to commence manufacture on a larger scale. For this purpose a small store was rented, and in it the parts made in the Franklin factory were assembled to make complete cars. In December, 1901, however, fire destroyed the improvised plant, and it was not until June, 1902, that business was resumed in still larger quarters. Just about the time the sale of the first product was recorded, the site on which the present factory stands was purchased and in July, 1902, ground was broken for a new factory. During the ensuing year just 11 cars were produced, and from that almost insignificant beginning the expansion of the Franklin factory has kept pace with the steadily increasing output, until to-day the yearly capacity is 2,000 cars and the factory buildings occupy some nine acres of ground. The site embraces practically an entire city block and the buildings afford some 300,000 square feet of floor space.

In the interim, however, the fundamental principles around which all Franklin cars are built have been retained practically intact, the only variations being those which experience has taught make for greater all-around efficiency. Thus, for instance, air-cooling, laminated wood frames, full-elliptic springs—all features which make for light weight—and large tires have been adhered to and developed. The close of the 10th successful year of marketing Franklin cars marks also the close of the first year under the "no yearly models" policy. The Franklin company was among the first to elide the date from its products, thus marking a well-defined step toward standardization that has been echoed by a number of other manufacturers within the past year.

Waverley Enters Large Truck Field.

While the line of battery-driven electric commercial vehicles built by the Waverley Co., of Indianapolis, Ind., has been quite a complete one within its range, until recently it included nothing larger than a three-ton truck. The list has been extended, however, by the addition of a new model—a five-ton battery truck, which, as built along practically the same lines as the three-ton machine, though, of course, of much heavier construction and of larger proportions throughout.

The Waverley single motor drive is employed, the 85 volt 60 ampere motor driving through heavy side chains to the rear wheels; current is furnished by a 324 ampere-hour battery having 42 cells of 25 plates each and weighing 2,540 pounds. This battery is sufficient to give the big machine a mileage, on level roads, of 35 miles on a single charge. One of the important advantages of the electric truck is the large area of its loading platform in proportion to the over-all length of the machine, and this is well exemplified in the new Waverley, which, with an outside length of 17 feet 8 inches, has a loading platform 14 feet long and 6 feet 6 inches wide. The total weight of the truck is 11,200 pounds. The wheels are of wood and all are 36 inches in diameter. It goes without saying that solid tires are employed; the front wheels are shod with 7-inch single tires and the rear wheels with 5-inch duals.

Where Acid May Be Damaging.

Soldering solutions containing acid are not suitable for use in making electrical connections because the acid, which is very difficult to remove entirely, is likely to corrode the wires in time and interrupt the circuit. This is especially true in the case of fine wiring. Acid also is destructive to insulation.

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TESTING MOTORS FROM THE INSIDE AND THE OUTSIDE

Various Methods of Measuring Power Delivered by the Crankshaft—Finding Out What Happens in the Cylinders and How the Gases Burn—Instruments That Make Moving Pictures of the Expanding Charges That Generate Pressure to Impel the Pistons.

As the builders of gasolene motors, profiting by the skill and knowledge born of long experience, increase the power and efficiency of their product from year to year, it is necessary that there should be some way of measuring the increase and recording it, so that there will be a ready standard for comparing the work of this year's motors with the work of the motors of last year and the year before. The difference between what satisfied men at one time and what they now demand as a matter of course is amazing.

For instance, the famous Dr. Diesel was by no means discouraged when his first motor blew itself to pieces without so much as turning over its own flywheel, and he was delighted when a later machine also blew itself to pieces, but did so without the assistance from a belt that the first motor received. Today it is by no means enough that a motor shall be able to run smoothly and continuously and develop enormous power for its weight; the engineer demands to know just how much power is being produced, and he further has become so extremely inquisitive that he demands exact information as to what is going on inside the cylinders while the motor is in operation. And, needless to say, he gets what he wants. While he cannot "put his eye on the end of a stick and poke it in" the cylinder to see what is going on, through the scientific application of comparatively simple principles he has evolved devices that inform him just what occurs at each stroke—more, even, for he can minutely follow every part of every stroke and can instantly see the effect of changes of adjustment in ignition or in carburation apparatus—in anything, in fact, that affects the operation of the engine.

The making of tests of power is more or less a cut-and-dried piece of work in motor factories. Each motor has to come up to a pre-determined standard. It is merely a question of constructing an apparatus that will absorb the power developed, and at the same time indicate it in such a way as to make comparisons possible. Such power measuring and indicating devices are known as dynamometers. Electricity, air resistance, water resistance, mechanical friction and magnetism all are brought into play in various types of dynamometers. The ancient and more or less honorable arrangement of a band brake around the flywheel connected to a lever or arm resting on a weighing scale once was supreme, but its many weaknesses have relegated it to the background. Though strictly speaking it is a dynamometer, it usually is known as the Prony brake, after its originator.

The great trouble with the Prony brake is that there is no really satisfactory method of regulating the pressure on the brake band and of carrying off the large amount of heat into which the power of the motor under test is converted. It can be done, of course, and is done, but the heat and the friction are prone to make more or less trouble for the engineer who is looking for the almost absolute accuracy that is necessary to-day. A form of dynamometer that answered very well indeed for shop test work consists of a marine propeller wheel running in a tank of water. A motor of a given size should turn a wheel of a given size so many revolutions per minute when developing its rated power; the power is absorbed in moving the water around in the tank, and the comparatively small amount of heat generated does not affect the result in any way. This method was a favorite with Charles E. Duryea at one time. It lacks flexibility, however, and is valuable just as it is used—as a shop outfit suited to the needs of that particular shop.

The fan dynamometer, in which the motor is coupled to a shaft carrying flat blades mounted on radial arms, is a machine of really modern type, for it is known exactly what power is required to turn the fan at a given number of revolutions per minute with blades of a given area, and therefore it is necessary only to connect the shaft to an accurate revolution indicator, graduated, however, in horsepower. When the motor is running the indicating needle will accurately show the momentary horsepower. Such a dynamometer is built by Joseph Tracy of New York.

In some cases an even simpler method is to connect the motor direct to a dynamo and, by means of a pair of meters, read the value of the current generated and convert it by a simple calculation into terms of horsepower, making the necessary corrections for the mechanical and electrical losses through the dynamo. The current can be absorbed by a water rheostat or passed through a bank of incandescent lamps. In some factories, where a large number of motors are tested in this way, the current generated is utilized to charge storage batteries, from which it is drawn for running motors in the shops. An interesting variation of the electric dynamomter takes advantage of the magnetic drag of the armature upon the field magnets, measuring this force instead of measuring the current. The dynamo in such a machine is not bolted direct to a bed plate; the field casting is mounted in ball bearings, so that it can rotate on the same axis as the armature. This movement is limited, however, by an arm rigidly fixed to the field casting and carrying at its outer end adjustable weights or springs. When the engine is started and the armature of the dynamo rotated, there is a magnetic attraction between the armature and the field magnets, tending to rotate the field and, of course, to raise the weights or to compress the springs at the end of the arm; the moment of this force will be in direct proportion to the power of the motor, so that a direct reading scale can be arranged that will at once give the horsepower. The current generated can be absorbed in any convenient way, and as it does not enter directly into the calculations, it is not necessary to measure it; it is merely a by-product, so to speak.

While these devices—or, at least, the best of them—will give accurate data as to horsepower output at various speeds and will test a motor for endurance by keeping a load on it as long as may be desired, this is by no means enough. Engineers must have far more detailed and accurate information in order to find out the effects of various changes or of various forms of construction. For instance, a motor builder decides, upon the strength of a theory that he has evolved in his own mind and to his own satisfaction, to change the timing of the valves of his engines. He makes the change and finds that, though the motor does not run in quite the same way as before, there is little or no gain in power; or, perhaps, he finds that there is a decided gain in power and that in all probability his theory is vindicated. But, with reference to the first case, why was there no increase in power, and what was happening in the cylinders? And in the second case, how does the engineer know that his theory was vindicated? He does not, really; he naturally assumes that because the thing he expected happened, that it happened in the way he thought it would. But he only thinks so; he is not sure, and he has not full and accurate knowledge of the principle involved.

In order to get at the very root of things—to graphically represent the sequence of events in the cylinder—it is necessary to borrow from the steam engineer the indicator. This instrument draws a diagram

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by means of the compound motion of a pencil or tracing point; the movement is the resultant of two forces acting at right angles to each other. One represents the movement of the piston, and is of fixed travel, while the other is caused by the pressure of steam in the cylinder, and is variable, rising as the pressure rises and falling as the pressure falls. The horizontal motion is taken direct from some reciprocating part, usually the crosshead, and, of course, reduced, in the case of the steam engine, and the motion indicating pressure is imparted by a piston working in a cylinder to which steam is admitted from the cylinder. This apparatus works very well at moderate speeds, but when it comes to the high R. P. M. rates that are normal to gasolene motors ,and even to many small steam engines, the considerable weights of the reciprocating parts make trouble because of their inertia. They will lag a little at the beginning of a stroke, and tend to overrun at the end, and they will prevent the apparatus from responding to slight changes of direction during the stroke.

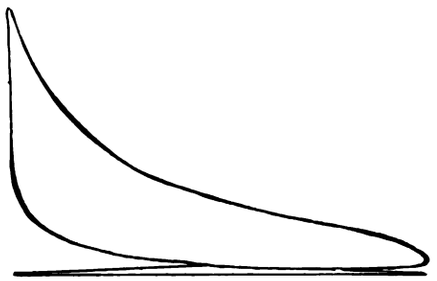
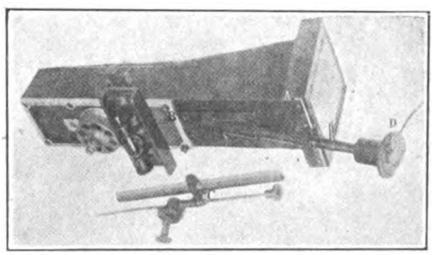


FIG. 1—SYMMETRICAL DIAGRAM

Therefore the steam engine indicator is a poor instrument for use with a gasolene motor when running at high speed—the only condition under which the indicator is of much real value.

The matter has another aspect. Suppose a diagram—a single diagram—is taken from a steam engine at a given R. P. M. rate and at a given steam pressure. As long as nothing is changed in the valve setting and other mechanical features of the engine, it can safely be assumed that a dozen or a hundred diagrams will be all exactly alike under the same pressure and R. P. M. conditions. In a gasolene motor, however, things are different. The characteristics of a diagram may vary considerably without appreciable change in speed or power, and a single diagram, or even several, may be misleading, even if accurate for the conditions existing at the time. What is needed, then, is an apparatus that will make not a single diagram, or even a series of diagrams, but what might be called a continuous diagram—a veritable moving picture of the succeeding cycles, showing, even while they are happening, the changes caused by the hundred and one little things that so powerfully affect the gas engine.

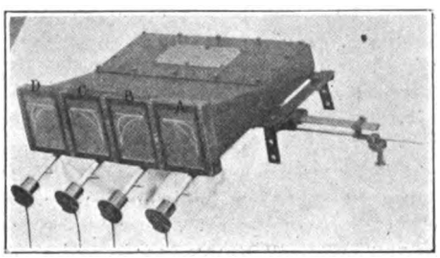
A diagram taken from a gas engine has an important advantage over a steam engine diagram in that, all the work being done on one side of the piston, a single diagram includes it all—intake, compression, expansion and exhaust. The intake causes a partial vacuum in the cylinder, and so the curve will drop below the line indicating atmospheric pressure. The inspiration of the charge completed, however, the pressure quickly rises above the atmospheric line, and during the following expansion and exhaust strokes the curve always is in the pressure area until, after the exhaust valve closes, the descending piston again creates a partial vacuum and



SCHULZ SINGLE-CYLINDER MANOGRAPH

the curve re-enters the area of negative pressure. In the case of a steam engine, however, work is done alternately on opposite sides of the piston, and in order to have a clear and complete record of a single cycle it is necessary to take diagrams from both ends. Comparison of the two diagrams will show lack of balance, faulty valve setting and so on, if such exist, but the gas engine diagram, with everything shown in a single curve, is a complete story in itself, and the things it can tell are almost beyond the belief of the non-technical mind.

To return, however, to the indicator itself, it will be of interest to go somewhat into



SCHULZ MULTI-CYLINDER MANOGRAPH

the details of the extremely ingenious instrument that has been devised to make the continuous diagram or "moving picture" of the gasolene engine cycle, practically eliminating the effects of inertia. The instrument is called a manograph, and though several makers have produced manographs that differ somewhat as to their details, the underlying principles are the same in all cases. The accompanying sectional illustration shows the construction of the Hospitalier Carpentier manograph, a French instrument that is used to a considerable extent in this country. The basic principle of this and other manographs of the same class is as follows: A dimunitive round mirror, half an inch in diameter, is pivoted at one end of a box-like casing, and is arranged to reflect a tiny point of light upon a ground glass screen at the opposite end of the box, the source of light being an acetylene burner or an electric lamp. By means of extremely accurate mechanism the mirror is caused to move in two directions. One movement is in a horizontal plane, and represents the stroke of the piston. The mirror is caused to oscillate from side to side so that the point of light projected on the ground glass screen moves to and fro in exact time with the piston stroke. In the absence of all pressure, as, for instance, if the motor were rotated by outside power with the valves wide open all the time, the point of light would trace a perfectly straight line across the ground glass near the bottom. With the engine moving slowly there would be visible just a moving point of light; but at high speed the eye would convey to the brain the impression of a straight white line. The stroke movement begins and ends precisely with the piston movement and the horizontal distance traversed does not vary. So much for the stroke. The pressure in the

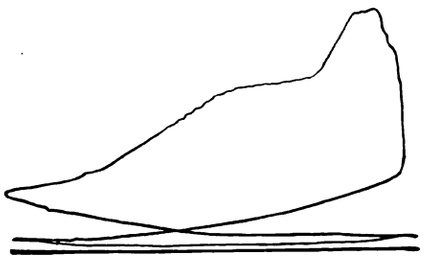


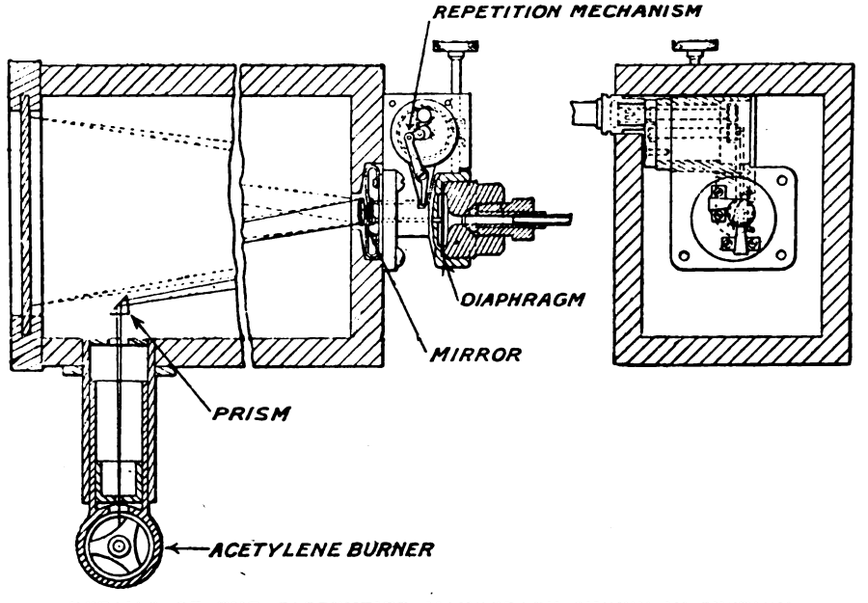
FIG. 2—CURIOUS COMBUSTION CURVE

cylinder is indicated by another movement. Considering this entirely by itself, and ignoring the stroke motion for the time, the mirror is made to throw its point of light upward when the pressure in the cylinder rises. The higher the pressure rises, the higher the point of light will ascend. Should the stroke-reproducing mechanism be disconnected and the mirror moved only by pressure, the light point would, of course, move straight up and down. When there is a partial vacuum or negative pressure in the cylinder, the point will go below the zero point, or line representing atmospheric pressure, the distance it drops being exactly proportionate to the vacuum, just as the rise is in direct proportion to the rise of pressure. So far as the mirror itself is concerned, the movement in either direction is extremely small, but it is enormously magnified on the ground glass. The further end of the beam of light moves through a much greater distance than the inner, or mirror, end, just as the further end of a long stick held in the hand will move through a much greater distance than the end by which it is held. This is where the mirror arrangement has its great advantage, for the mechanical movements required are very minute indeed, the mechanical parts are extremely small and light, and the magnifying apparatus—the beam

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of light—has absolutely no weight. Therefore there is so little inertia in the instrument that there is no distortion that can be measured, and the pressures are followed with the utmost fidelity and accuracy. The actual length of the diagram on the ground glass screen is four inches; but for exhibition and other special purposes the point of light can be thrown on a larger screen, making a diagram 28 inches long, and, notwithstanding the enormous magnification of the tiny movements of the mirror, the diagrams are accurate and clear.

Having indicated the two distinct movements that are imparted to the mirror and so to the point of light, it remains to be seen how these two straight line motions, one horizontal and the other vertical, are combined to form curves. Assuming that



DETAILS OF THE CARPENTIER MANOGRAPH SHOWN IN SECTION

the manograph is connected up to the engine that is to be "indicated"—which is the term commonly used—it follows that as soon as the piston stroke commences the mirror will be deflected horizontally; but the instant the pressure in the cylinder commences to rise, the mirror will be deflected vertically. Obviously, as the piston stroke and the rise of pressure occur together, there will be two movements imparted to the mirror simultaneously. The stroke motion will carry the point of light along toward the opposite end of its travel, but at the same time the pressure will push the point upward, and instead of moving in a straight line, the point will move in an upwardly sweeping curve. The highest point touched by the point of light will be the point of highest pressure, and if this point occurs at the end of the diagram it will mean that the pressure was highest at the end of the stroke; if the curve is highest when the line has traveled three-quarters of the length of the diagram, it will indicate that the pressure was highest at three-quarters of the stroke, and so on.

Of course, the usefulness of the instrument is wholly dependent upon the accuracy with which the movements representing stroke and pressure are imparted to the mirror, and the correct proportions existing between the motions. The back of the mirror rests against three points which form a right-angled triangle. At the apex of the right angle is the joint upon which the mirror swings. The second point is the end of an almost microscopic steel rod which transmits the pressure-indicating motion. The opposite end of the pressure rod is attached to a flexible diaphragm of special steel, and the opposite side of the diaphragm forms one side of a chamber which is in communication with the motor cylinder through the medium of a tube, so that pressure in the cylinder will travel through the tube, cause the sensitive diaphragm to bulge slightly and so transmit motion to the little rod and the mirror. The method of imparting motion to the stroke rod is less simple. As it obviously is impossible to take motion direct from the piston or connecting rod, it is necessary to make connection with some part that has a movement synchronous with that of the piston. The crankshaft usually is the most convenient point of attachment. By means of a special coupling a flexible shaft is rotated by the crankshaft and rotation is transmitted to what is termed the "repetition mechanism" of the instrument. This consists of a pair of gears, very small, one of which is connected, through its shaft, with the flexible driving shaft, and the other gear, meshing with the driving gear, carries a diminutive crankpin which, through a link, oscillates the double-armed lever that delivers the actual push to the mirror.

At this point there is one of the most ingenious features of the instrument. Clearly it is necessary that the point of light projected by the mirror should begin its horizontal stroke-motion at exactly the same time the piston commences its stroke. If connection were made direct to the piston there could be no difference in this respect, but as connection is made through the crankshaft, it is probable that when the coupling is made the mirror will be caused to make its horizontal swing quite out of time with the piston. A synchronizing device is included in the repetition mechanism and is controlled by a milled head outside the box, so that the timing can be adjusted with the utmost accuracy. The driving gear, which has its shaft coupled to the flexible driving shaft, is so mounted that it can be rotated around the driven gear carrying the little crankpin, after the manner of the familiar planetary gear system; the mounting consists of a brass disk having teeth cut in its circumference meshing with a worm operated by the milled head already referred to. When the milled head is turned the brass disk is caused to rotate, carrying the driving gear with it in a path forming a circle around the driven gear. If the plate is turned in the direction of rotation of the driven gear, the timing of the mirror movement will be advanced, and if turned in the opposite direction, the timing will be retarded.

This done, however, there still remains the question of how to determine when the piston is exactly at the end of its stroke. This is accomplished in an admirably simple and exact manner. If, when the instrument is connected up to the engine, the crankshaft is rotated by hand or other outside power, the pressure of compression in the cylinder will attain its maximum precisely at the end of the compression stroke. The point of light on the screen will indicate maximum pressure exactly when it occurs, but if the stroke reproducing mechanism is out of time with the piston, the point of maximum pressure will seem to occur somewhere along the stroke instead of exactly at the end of it. Therefore, the gears must be adjusted, by means of the mechanism referred to, until the point of maximum compression coincides exactly with the limit of horizontal movement of the point of light—in other words, when the pressure commences to drop, the point of light must be commencing its return stroke. If there is no leakage in the valves or piston rings the line traced on the screen on the return stroke will coincide exactly with the line traced on the pressure stroke. If there is leakage, the curve on the expansion stroke will drop below the compression curve in exact proportion to the amount of leakage. The usual method of synchronizing the manograph is to run the motor at a fairly high speed and then cut off the ignition, allowing it to turn over for a few strokes without combustion. The diagram traced will indicate the state of the adjustment, and by switching on the ignition and speeding up the motor and then letting it run and making the adjustment a few times the timing can be done with very little trouble.

It will be seen that the indicator will show at once whether a motor loses com-

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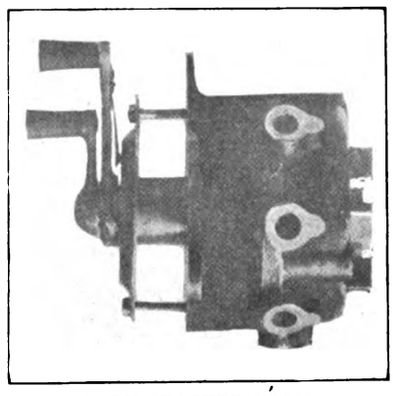
pression, and also just how much compression it loses in pounds per square inch. Other things that may be learned are indicated by the diagrams, No. 1 and No. 2, which were taken with a manograph with a sensitized plate inserted in a plate-holder in place of the ground glass screen. No. 1 is a very symmetrical, smooth diagram, showing entirely normal conditions; it was taken from a De Dion motor running at 1,305 R. P. M. Among other things, it shows that the exhaust valve commenced to open before the completion of the expansion stroke, for when the valve opens the pressure immediately drops, causing a corresponding drop in the curve near its "toe," so that by the time the exhaust stroke is commenced the pressure upon the piston has been reduced considerably. It is evident that the intake valve was of ample size and the intake passages afforded free ingress to the gases, for the vacuum shown by the lower line is slight.

The motor from which No. 2 was taken was running at 1,500 R. P. M., and shows some marked variations from the first diagram. The most conspicuous is the hump in the expansion curve. In diagram No. 1 this curve is a smooth sweep right down to the opening of the exhaust valve, showing an even rate of expansion; but in No. 2 the drop in pressure was interrupted suddenly by a phenomenon of some sort which caused a sudden auxiliary expansion, so to speak, of the gases, which for a considerable portion of the stroke maintained the pressure almost stationary, notwithstanding the rapid outward movement of the piston and the consequent increase in the volume of the space that the gases had to fill. Had the piston been stationary when this occurred the pressure would have risen to a high value. This sudden expansive tendency, of course, increases the mean effective pressure, and the power of the motor; it is accounted for by the theory of recrudescence which is, in effect, that under certain conditions during combustion the gases form chemical combinations favorable to a sudden re-heating and consequent increase of pressure. This diagram shows also that the exhaust valve opened at the end of the expansion stroke, as the pressure is maintained clear to the turning point of the stroke. Ignition was slightly advanced, as the compression curve shows by its sudden upward shoot just before the end of the stroke, but the maximum pressure of the burning gas was not attained until the piston had commenced to move down on the expansion stroke.

The Schulze manograph, which is made in Alsace-Lorraine, differs from the Carpentier instrument in that it is designed for permanent attachment to a motor or for installation in a testing room on the testing stand, while the Carpentier is of the portable type, being set up on a tripod. The Schulze takes its stroke motion through a train of gears driven from one of the camshafts and synchronizing is done by means of a pair of gears which can be made to unmesh and skip one tooth at a time until the timing is accomplished. The lighting arrangement is somewhat different, but the actual operation and the basic principles are the same as in the Carpentier. The Schulze is made in quadruple form, so that all four cylinders of a motor can be indicated at the same time. Illumination is by means of Nernst electric lights enclosed in tubes, through which the light is reflected back to the mirrors.

Special Features in Crary Starter.

Among the motor starters recently added to the long list of those already on the market is the Crary, manufactured by the T. C. F. Mfg. Co., of 650 Woodward avenue, Detroit, Mich. Of the type in which acetylene gas in its pure state is injected into the cylinders to make an explosive mixture by mingling with the air they contain,



CRARY STARTER VALVE

the Crary starter also makes use of a special connection to the manifold for running the motor on acetylene after it has been started, and has special means for injecting the gas into the cylinders in the most advantageous manner.

As the accompanying illustration shows, the Crary distributer is of circular form, with the various pipe connections spaced around its periphery. The main feed pipe is attached to the tank by means of a special connection which takes the place of the usual lamp connection and has unions for attaching the lamp piping and also has shut-off valves for the different outlets. The cylinder leads are connected to special cylinder injector plugs, which are so made that the priming cocks, removed from the cylinders to permit the installation of the starter connections, can be screwed into the tops of the plugs and there serve their original purpose. The ends of the injectors are considerably elongated, so that they project into the cylinders and carry the gas away from the spark plugs, to circulate and become thoroughly mixed with air.

The distributer is attached to the motor side of the dashboard, and is connected to the two controlling handles mounted on a circular plate on the opposite or driver's side of the dash, a hole being cut through for the purpose. One of the handles controls a needle-valve which acts as a shut-off, while the other takes care of the distributer. In starting the motor the needle-valve is opened first and the distributer handle swung around until gas is admitted to all the cylinders; beyond this, the handle opens the feed to the manifold, so that when the motor is started in the usual way, by switching on the spark, it will continue to run on acetylene gas taken in through the manifold connection until shut off. This makes it possible to run on the gas as long as may be required to warm up the motor, and is especially useful in cold weather.

A special feature of the Crary starter is that in cases where the injected gas naturally would flow directly upon the spark plugs, the injecting pipes, or as much of their length as is within the cylinders, can be bent to shoot the gas as desired.

Easy Way of Finding Dead Center.

About the easiest method of determining the dead center position of the piston where the cylinder head is not pierced is to remove the porcelain from a spark plug and solder a piece of brass tubing in its place. Insert the plug in the proper place and slip a piece of rubber tubing over the end of the brass pipe, immersing the other end in a pail of water. Bubbles will issue from the submerged end of the rubber tube when the pison is on the up stroke, but will cease as soon as the piston reaches the top of the stroke.

When Spark Gap May Cause Misfiring.

When a car is equipped with both magneto and battery ignition working on the same set of plugs, it sometimes happens that although firing is perfectly regular when the magneto is supplying the current, irregular firing results from the use of the batteries. The trouble is occasioned by the smal lgap of the plugs, which is ideal for magneto ignition, but which is liable to cause missing when the batteries are switched on.

Where Copper Rivets Are Essential.

When a brake lining wears out it becomes necessary to replace it, and the new lining is riveted in place. In doing this work care should be taken to use copper rivets, for iron rivets, if used, are apt to cut the brake drums when the lining wears down to the rivet heads. In fact, it does not take long to completely ruin a pair of brake drums in this way. The copper, on the other hand, wears down with the lining and does no harm.

About the Figuring of Piston Areas.

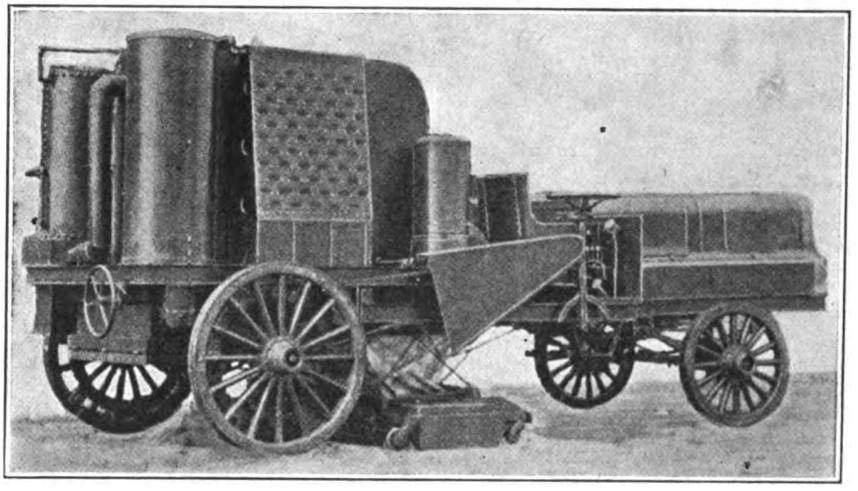
Some people still believe—and doubtless some people always will believe—that the aggregate pressure on a piston can be increased by increasing the area without increasing the diameter, as by making the piston head concave or convex. In figuring the pressure on a piston, the only area that enters into the calculation is the projected area—that is, the area of a disk of the diameter of the piston.

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VACUUM CLEANER FOR DIRTY ROADS

Gasolene Propelled Machine, Designed for Paved Surfaces, Used in Indianapolis—Employs Crew of Two Men.

Probably in no field has the motor vehicle proved more efficacious than in the different departments of municipal service, where the divergent duties to which it is applicable necessitate the use of vehicles of special design. In street cleaning departments, for instance, nearly all the machines are of special construction, and they embrace many features which are never found in motor trucks of conventional design, and which serve to fit them for the duties of sweeping, washing or scrubbing up the accumulation of dirt from the city streets, or scraping or rolling dirt or macadam roads.



INDIANAPOLIS'S MOTOR PROPELLED VACUUM STREET CLEANER

Not the least interesting of such machines —they can scarcely be called vehicles in the true sense of the word—intended for dirt removing duty where asphalt or similar pavement is used, is the motor driven vacuum sweeper made by the Furnas Pneumatic Sweeper Co., of Indianapolis, and which has lately been placed in service in that municipality. The apparatus, which is shown in the photograph, is an evolution of the steam driven vacuum cleaner which formerly was exploited, and not without some degree of success, by the same company.

A four-cylinder 60-horsepower motor, with cylinders of 6 inch bore and stroke, placed under a hood in the front of the machine, supplies the motive power both for propelling the machine and for operating the exhaust fan which creates the vacuum for the removal of the dirt. Transmission is of the friction disk type, abnormally long chains serving to transmit the motion from the shaft of the friction wheel which is placed at the front of the motor, to a differential-bearing jack shaft, placed under the driver's seat. A second set of chains transmits the motion to the rear wheels. The machine, which weighs two tons and measures 19 by 8 feet in length and breadth, respectively, is mounted on wooden wheels of the type used on horse drawn vehicles.

Behind the driver's seat are placed the cleaning implements, which include an exhaust fan of the centrifugal force type, sweeping hood suspended under the frame of the vehicle by means of chains, a centrifugal separator which removes the dust and dirt from the air and deposits them in the hopper, and a small steam boiler which serves to dampen the air so as to lay the dust. The fan is driven through the intermediary of a cone clutch placed at the rear of the motor.

The sweeping hood, which is made of canvas reinforced with metallic strips and which can be shifted as need be, is double, one chamber surrounding the other. Vacuum is created in the innermost chamber and the air rushes from the outer chamber to take the place of the air displaced by the fan, and in so doing carries the street filth along with it past the fan and through sheet metal passages to the separator. Steam is introduced into the separator, and the dampened dust is deposited in a hopper, from whence it is emptied from time to time. The same air is used over and over and passes, after the dirt has been removed, through the outer chamber of the sweeping hood and again starts the cycle.

A brush made of stiff wire bristles, is positioned directly in front of the sweeping hood and can be applied with varying pressure to the surface being swept, so as to loosen any accumulations which have hardened on the pavement.

Two men are required to operate the machine. The driver controls the steering and the propulsion and fan speeds, while the second operator controls the air pressure by means of a damper, and the position of the sweeping hood, and also fires the steam boiler. It is claimed that the machine is capable of cleaning from 150,000 to 180,000 square feet in an hour.

PRICE OF FUEL AROUSES ENGLAND

Leads to Meeting Under Auspices of Royal Automobile Club—Chief Distributer Attempts an Explanation.

According to the findings of those concerned in a meeting which was held by the Royal Automobile Club in London, England, last week, the only hope of British motorists for a reduction in the cost of gasolene, or petrol, as it is termed abroad, lies in the establishment of home refineries.

As is the case in America, the cost of gasolene in most parts of England has gone up almost by leaps and bounds within the last twelvemonth, and the meeting which was called by the R. A. C. was for the purpose of getting the producers, the retailers and the consumers together with a view to determining the reason for the increase in price and the present high cost of fuel and, if possible, to deduce some method whereby the lower prices enjoyed in the past again might be realized. Sir Marcus Samuel, who is the head of the company which markets "Shell spirit," the same being gasolene sold sealed in two gallon cans at 32 cents a gallon, submitted to being questioned by those assembled and he placed the blame for the present high price of fuel directly on the Port of London Authority, which, he claimed, prohibited the unloading of gasolene laden ships nearer to London than Thames Haven, which is 32 miles distant. The necessity for rehandling and an overland journey, he said, was responsible for the increase in price, the increase being proportionate to the increase in demand and the necessity for transporting greater quantities of fuel over the intervening 32 miles.

As on his own intimation he had been unsuccessful in his efforts to have the by-laws amended so as to permit the unloading of gasolene directly at the London docks, a committee composed of members of the R. A. C., the Automobile Association, the Society of Motor Manufacturers and other kindred bodies was appointed to confer and use its best efforts to bring about the desired legislation.

Oil That Affects Inner Tubes.

It is not an uncommon thing for an inner tube to be hung over a side lamp before inserting it in a casing, or after removing it. When this is done, however, care should be taken to see that if the lamp burns oil, there is none of that tire-destroying substance where it can reach the tube.

Soldering Solution Which Has Merit.

There are few soldering solutions that are better than rosin dissolved in alcohol. When this mixture is applied the alcohol rapidly evaporates, leaving the rosin spread thinly and evenly over the surfaces to be soldered.

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STARTING MAGNETO-FIRED MOTORS

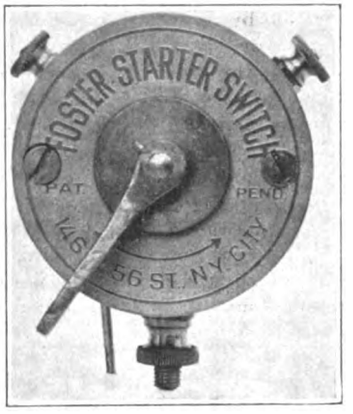
Foster Evolves Ingenious System That Accomplishes Purpose—Simple Both in Design and Operation.

While the magneto as a source of current for ignition purposes has advantages that cannot be questioned, it possesses one inherent drawback that became prominent simultaneously with the attainment of popularity by the acetylene type of motor starter. That is to say, the magneto is incapable of generating electricity when it is idle. For this reason, cars that are designed and built with magneto ignition only cannot be equipped with acetylene starters as readily as cars that have battery ignition systems, due to the absence of means of producing the initial spark.

This difficulty seems to have been met, however, by a simple apparatus that just has been brought out by the Foster Appliances and Specialties Co., of 146 W. 56th street, New York, and which is designed to make possible the installation of an acetylene starter in a car with only magneto ignition, without installing a battery ignition system or even an extra distributer. Briefly, the idea is to use a battery and vibrator coil to produce the necessary spark and to wire these, through a dashboard switch, to the high-tension distributer of the magneto, so that by turning on the gas through the starter and swinging the switch, sparks will be generated in the proper cylinder and the motor started.

The Foster outfit consists of the special dashboard switch, a vibrating coil, a little attachment which opens the magneto circuit and transfers the connection from the magneto itself to the dashboard switch, and the necessary high-tension cable, all packed in a wood box 7 x 7 x 4½ inches. The switch is placed on the dash, in any convenient place, and the spark coil stowed under the seat or in any protected position together with the 4 volt or 6 volt battery, which may be either a storage battery or a set of dry cells. The battery is connected up to the primary terminal of the three-terminal spark coil, and the high-tension terminals are carried to two of the five binding posts on the switch. The magneto attachment is put in place by removing a nut on the magneto collector ring and replacing it with the attachment, which has two terminals from which two wires are run to the switch, the one remaining terminal of which is grounded, as is also one battery wire.

When the dashboard switch is in running position the magneto works exactly as usual, except that the high-tension current generated travels to the distributer through the wiring and the switch, instead of taking the former shorter route—which, of course, makes no difference in the operating of the ignition system. But when the switch is thrown either to right or left—it works equally well either way—the battery and coil are thrown into the circuit and the magneto armature cut out. The current passes, through the switch, to the high-tension distributer and a stream of sparks is produced at the plug of the cylinder that is in firing position. The starting outfit keeps the motor running until the switch is



FOSTER'S STARTER SWITCH

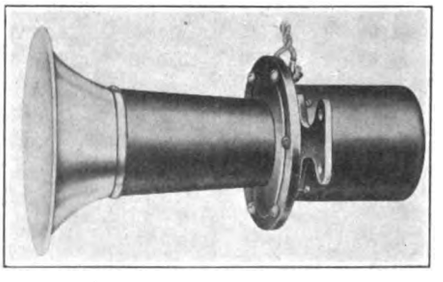
returned to the running position, when the magneto takes up its work.

Starting is facilitated by the fact that there is a rapid succession of sparks at the plug rather than a single spark. Any acetylene starter can be used, or the device can be used to start the motor on the spark in the ordinary way, with gasolene vapor in the cylinders. None of the parts are working except when the starter is in actual operation.

Klaxon Adds Popular-Priced Horn.

By way of supplying the demand for a reliable electric horn that more nearly approaches the popular-price standard, the Lovell-McConnell Mfg. Co., Newark, N. J., has added a new and smaller horn to the Klaxon family.

As the "baby" addition to the family is



THE NEWEST KLAXON

smaller than the Klaxonet, which at present is the smallest horn in the line, it quite appropriately will list for less. Despite the fact that it will be a moderate-priced horn in the real sense of the meaning, however, its mechanism is as trustworthy as that which produces the characteristic blasts from the Klaxon and the Klaxonet and is built along exactly the same lines. That is to say, the "internals" consist of a small motor, a rotor and a steel diaphragm, the latter being vibrated rapidly under the persuasion of the rotor, which is direct connected to the electric motor. The external appearance of the new horn is slightly different from that of its older prototypes and is shown by the accompanying picture.

September 1st has been set as the date for its formal appearance on the market, though it has not yet been decided under what name it will be marketed. In the mean time, suggestions are sought for an appropriate monicker, the assurance of the Lovell-McConnell company being that the person who suggests the best name will fall heir to a prize of $100. The selection of a name will be made on July 16th, before which time all suggestions should be in the hands of the manufacturers.

Grease Cups that Keep Caps On.

Plain grease cups with no means of holding their caps from backing off and getting lost can be used if one is willing to keep on supplying new caps and to put up with the bother and the risk attendant upon the loss of grease and the running dry of the surfaces the cups are supposed to lubricate. It is a great deal better, however, and not much more expensive—in fact, cheaper in the long run—to employ a set of really good cups with locked caps. A great cup cap may go on quite stiffly and seem secure, but it is amazing what vibration will do in the way of shaking off things that appear to be immune from such trouble.

How to Avoid Marring with Hammer.

There is little or no excuse for the mechanical crime of striking finished metal surfaces with a hard hammer. A piece of brass, copper, wood, or fiber can be placed on the metal, or a hammer made of lead or babbitt—any one of a dozen things may be used for the purpose of avoiding the marring that is sure to result if a hard hammer is made of very hard steel; and machined metal will be soft by comparison and consequently will be marred quite easily by even light blows.

Flux That Should Be Removed.

In electrical wiring where there are soldered joints it sometimes happens that the soldering flux used is not entirely removed and what remains destroys insulation and permits grounding or short circuiting, or possibly, in extreme cases, may corrode the wire sufficiently to allow it to break. Trouble of this kind is particularly bothersome, because it is likely to occur in places that are out of sight.

Cap as Source of Valve Trouble.

Where caps of cast bronze are screwed into the openings over valves, it sometimes happens that the metal will be so thin in one place that it will be fractured by the explosion pressure. This, of course, is a somewhat rare occurrence, but it is by no means unknown, and in case of mysterious trouble it is well to take a glance at the caps.

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Foreign Corporation Not Outlaw.

(Continued from page 34)

"As the trial was had before the referee pursuant to the stipulation, the only question presented here is whether there is any error of law in the judgment rendered by the court upon the facts found by the referee. The findings of fact are conclusive in this court. We cannot review any of the exceptions to these findings or to the refusal of the referee to find facts as requested (Roberts v. Benjamin, 124 U. S., 64, 71, 74; Shipman v. Straitsville Mining Co., 158 U. S., 356, 361; C., M. & St. P. R'y v. Clark, 178 U. S., 353, 364; Heckers v. Fowler, 2 Wall., 123; Bond v. Dustin, 112 U. S., 604; Paine v. Central Vermont RR., 118 U. S., 152, 158).

"Under section 15 of the General Corporation Law of the State of New York a foreign stock corporation, other than a moneyed corporation, is prohibited from doing business in the State without having first procured from the Secretary of State a certificate that it has complied with certain prescribed conditions. The corporation is required (sec. 16) to file with the Secretary of State a sworn copy of its charter, and a statement setting forth the business which it proposes to carry on in the State; to designate its principal place of business within the State, and to appoint a person upon whom legal process may be served (Wood & Selick v. Ball, 190 N. Y., 217, 224). Section 15 provides: 'No foreign stock corporation doing business in this State shall maintain any action in this State upon any contract made by it in this State unless prior to the making of such contract it shall have procured such certificate.' In his original report the referee found that the Lupton company was doing business in the State of New York within the meaning of the statute without a certificate of authority, and after the report was recommitted he made additional findings with respect to the nature of its business, upon which the plaintiff in error bases his contention that the statute has been held to apply to transactions in interstate commerce which were not subject to the State's interdiction. It is not necessary, however, to review these findings, for the statute has received a construction by the highest court of the State of New York which precludes it in any aspect of the case from being regarded as a bar to the maintenance of this action.

"The referee's ruling that the contract was void was based upon the statement in the opinion in Wood & Selick v. Ball (supra) that 'the procuring of a license must precede the transaction of business or the contracts of the corporation are not lawful.' But in Mahar v. Harrington Park Villa Sites (204 N. Y., 231) the Court of Appeals of New York has declared that a contract made by a foreign corporation doing business within the State without a certificate of authority is not absolutely void; that the only penalty prescribed by the General Corporation Law for a disregard of the provisions of section 15 is a disability to sue upon such a contract in the courts of New York, and that the contract remains valid and effective in all other respects.

"In the Mahar case, the action was brought to recover a sum deposited under a contract made in New York with the defendant, a foreign corporation, which it was alleged was transacting business in the State without authority at the time the contract was made. It was asserted, in support of the action, that the contract was void and hence that there was a failure of consideration. The Court of Appeals held that the complaint did not state a cause of action. In the opinion delivered by Willard Bartlett, J., in which the majority of the court concurred, it is said:

"'It is assumed in the prevailing opinion'—that is, the opinion below (146 App. Div., 756)—'that this court held in the case of Wood & Selick v. Ball (190 N. Y., 217) that non-compliance with the requirements of that section has the effect of rendering any contract made by such a corporation in this State absolutely void. Such is not my understanding of the purport of that decision. The only proposition decided in that case was "that compliance with section 15 of the General Corporation Law should be alleged and proved by a foreign corporation such as the plaintiff in order to establish a cause of action in the courts of this State." . . . The only penalty which the General Corporation Law itself prescribes for a disregard of the provisions of this section is a disability to sue upon such a contract in the courts of New York. "No foreign stock corporation doing business in this State shall maintain any action in this State upon any contract made by it in this State unless prior to the making of such contract it shall have procured such certificate" (Cons. Laws, chap. 23, sec. 15). This prohibition would be effective to prevent the appellant from suing the respondent upon the contract alleged in the complaint; but in my opinion it is not operative to wholly invalidate the contract. I think that the penalty imposed upon a foreign stock corporation for doing business in New York without the certificate of authority required by section 15 of the General Corporation Law is limited to that thus prescribed in the section itself. No doubt the Legislature could have gone further and declared all contracts to be void which were made by a foreign stock corporation doing business in this State without having obtained the certificate; but it has not done so. This was the view taken in Alsing Co. v. New England Quartz & Spar Co. (66 App. Div., 473; aff'd 174 N. Y., 536), where it was held that section 15 did not prevent a foreign stock corporation doing business here without having procured the necessary certificate from recovering upon a counterclaim growing out of the transaction upon which the plaintiff sued. "The defendant, having been brought into court and thus made to defend," said Justice O'Brien in that case, "should be allowed, unless there is a distinct provision to the contrary, not only to defend but also to litigate any question arising out of the transaction that has been made the basis of the plaintiff's complaint. There is no such prohibitive provision in this statute, and therefore the obtaining of the certificate would not be a prerequisite to a recovery upon the counterclaim in question" (p. 476). The Supreme Court of the United States has distinctly held that a contract made by a foreign corporation with a citizen of another State is not necessarily void because the corporation has not complied with the laws of such other State imposing conditions upon it as a prerequisite to the lawful transaction of business therein. In Fritts v. Palmer (132 U. S., 282) a tract of land in Colorado had been conveyed to a Missouri corporation in disregard to constitutional and statutory provisions which prohibited a foreign corporation from purchasing or holding land in that State until it should acquire the right to do business therein by fulfilling certain prescribed conditions. Here the Missouri corporation had unquestionably violated the laws of Colorado when it purchased the property without having previously designated its place of business and an agent, as required by the Colorado statutes. The only penalty which the statute provided, however, for non-compliance with these provisions was that the officers, agent and stockholders should be personally liable on any contracts of such foreign corporation as might be in default. The Supreme Court held the fair implication to be that, in the judgment of the Colorado Legislature, this penalty was ample to effect the object of the statute prescribing the terms upon which foreign corporations might do business in that State; and hence the judiciary ought not to inflict the additional and harsh penalty of forfeiting the estate which had been conveyed to the Missouri corporation. In other words, the court refused to treat the conveyance as void, notwithstanding that it was made to a corportaion which was forbidden to receive it.

"'If I am right in assuming that the only infirmity in the contract mentioned in the complaint is the disability of one of the parties to it, namely, the foreign corporation, to sue upon it in the courts of this State, it remains a valid and effective instrument in all other respects.'

"In this view, despite its transaction of business without authority, the foreign corporation could sue upon its contracts in any court of competent jurisdiction other than a court of the State of New York. Accordingly it was held by the Court of Errors and Appeals of New Jersey that a suit might be brought by the corporation in that State upon a contract made in New York, where it was doing business without the prescribed certificate (Allegheny Co. v. Allen, 69 N. J. Law, 270). The court

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conceded the general rule both in New Jersey and New York to be that a contract void by the law of the State where made would not be enforced in the State of the forum. But it was held that the New York statute did not in terms declare the contract void; it provided that no such action should be maintained in that State.

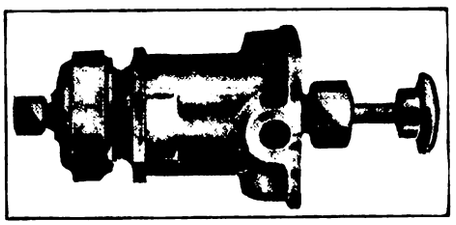
"In dismissing the writ of error to review that judgment (Allen v. Alleghany Co., 196 U. S., 458, 465) this court commented upon the decision of the New York court in the case of the Neuchatel Asphalte Co. v. The Mayor (155 N. Y., 373), which arose under the statute in an earlier form, the section (15) of the General Corporation Law then providing that the foreign corporation should not maintain 'any action in this State upon any contract made by it in this State until it shall have procured such certificate.' This court said: 'The Court of Appeals in that case held that the purpose of the act was not to avoid contracts, but to provide effective supervision and control of the business carried on by foreign corporations; that no penalty for non-compliance was provided, except the suspension of civil remedies in that State, and none others would be implied. This corresponds with our rulings upon similar questions (Fritts v. Palmer, 132 U. S., 282).'

"It must follow upon the similar construction of section 15 as it read at the time of the transaction in question, that the Lupton company, whether or not it was doing a local business in New York, had the right to bring this suit in the Federal court. The State could not prescribe the qualifications of suitors in the courts of the United States and could not deprive of their privileges those who were entitled under the Constitution and Laws of the United States to resort to the Federal courts for the enforcement of a valid contract (Union Bank v. Jolly's Adm'rs, 18 How., 503, 507; Hyde v. Stone, 20 How., 170, 175; Cowles v. Mercer County, 7 Wall., 118, 122; Ins. Co. v. Morse, 20 Wall., 445; Barron v. Burnside, 121 U. S., 186; Lawrence v. Nelson, 143 U. S., 215; In re Tyler, 149 U. S., 164, 189; Barrow SS. Co. v. Kane, 170 U. S., 100, 111). The State in the statute before us made no such attempt. The only penalty it imposed, to quote again from the Mahar case, was a disability to sue 'in the courts of New York.' Before the decision of the State Court, the Circuit Court of Appeals for the Second Circuit reached the same conclusion as to the meaning of the statute and upheld the right of the foreign corporation to sue in the Federal court (Johnson v. N. Y. Breweries Co., 178 Fed., 513, 101 C. C. A., 639). The court below erred in dismissing the complaint.

"With respect to the facts going to the merits of the claim of the Lupton company, the referee made numerous findings which it is not necessary to set forth or to review at length. The contract provided that 'in the event of any strike or cessation of work, caused by character or condition of labor employed or material furnished,' the owner should have full authority 'to arbitrate or adjust the matter,' and the contractor should make good the loss, to be fixed by the architect or by arbitration. This clause was evidently inserted to meet the sort of difficulty which actually arose. The referee found, as has been stated, that it was 'on account of the character and condition of labor employed by the plaintiff and the material furnished by it' that the strike took place, and all the other persons employed on the building stopped work. It was also found that to complete the contract the defendant necessarily expended the sum of $3,796.76. This was done under an adjustment by the architect, and upon the findings the defendant was properly allowed a credit for the amount thus paid. There remained due to the plaintiff the sum of $709.52, for which it was entitled to judgment, with interest.

Motor Starter With Novel Injectors.

Motor starters of the acetylene gas type had not been in use very long before it was discovered that it was inimical to successful



SIMPLEX PUMP VALVE

operation to permit the injected gas to form a heavy, rich mixture at the sparking points because, though mixtures of acetylene gas and air have an extremely wide range of combustion, when too rich a great deal of carbon is formed, the spark plugs are fouled, there is insufficient pressure for starting the motor. It was found necessary to so direct the inflowing stream of gas that it would become well mixed with air before reaching the plug points. In the Simplex starter, which just has been placed on the market by the Simplex Self-Starter Co., of Detroit, Mich., particular attention has been given to this requirement, and the injecting nozzles are made without outlets, the proper direction for the flow of gas being determined for the particular motor to which the starter is to be applied and the openings, in the form of small slits, cut with a file.

The distributer, which is mounted in the dashboard at the most convenient point, is of the pump type, designed to be foot-operated, and is connected with the gas tank and the cylinders by the usual small-bore copper tubing. A special connection, with the necessary valves, is provided for the tank; this is attached in place of the regular tank fitting designed for the lamps only, and contains connections for both lamps and starter. The cylinder connections are designed to be screwed in place of the priming cocks, and in order to retain the cocks, they are screwed into the tops of these fittings, where they serve their purpose in the usual way.

The gas nozzles are made quite long to carry the gas well into the body of air in the cylinders, and are made in different lengths, so that if the piston does not give clearance for a long nozzle a shorter one can be substituted. The nozzles are simply tubes with no outlets, the ends being closed. When it has been ascertained just how the injector will stand when screwed in place, the outlet is made with a file, in the form of a slit about 1-32 of an inch wide, located so that the gas will pass clear of the spark plug and circulate around the combustion chamber, mixing with the air and becoming well diffused before returning to the plug. When the cylinders have been primed with gas forced in by the pump, the motor is started by means of the ignition switch, which causes the ignition of the charge in the customary manner.

To Assure Aspiration of Engine.

One of the manufacturers who has entered "creations" in the French Grand Prix race—his name remains a dire secret—has adopted a novel though not altogether unheard of means of insuring that his engine shall aspire complete charges of combustible gas. The engine is of the four-cylinder variety, though the crankshaft is arranged for six cylinders, the two extra cylinders operating merely as pumps. The power producing cylinders operate on the orthodox four-cycle plan, with the difference that after each piston has reached lower dead center on the aspiration stroke and the suction through the carburetter has ceased, an additional charge of "mixture" is pumped into the combustion chamber by means of the pumping cylinders, the admission being controlled by a rotary valve. Though little or nothing regarding the construction of the engine or its dimensions has been made public, it is said that the power developed is nothing short of remarkable and that the noise of the exhaust truly is "deafening."

Folding Stool for Emergency Use.

It is not always possible, and even when possible it is frequently inconvenient, to have a folding seat of the usual kind in a small car; nevertheless, there are sure to arise occasions when something of the sort would be useful, and it is to meet the call for such a seat that the Glendale steel folding chair just has been placed on the market by the Glendale Mfg. Co., of 154 West 34th street, New York. This stool is made of pressed steel, with a heavy duck seat, and though it is claimed to have sufficient strength to carry a weight of 400 pounds, its weight is but two pounds. It folds by the mere lifting of a cord, and rolls into a case that approximates the size and shape of a music roll and has a convenient handle for carrying, as shown by the accompanying illustration.

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1,009,216. Exhaust Silencer for Internal Combustion Engines and the Like. George Arthur Bishop, Leeds, England. Filed Feb. 18, 1911. Serial No. 609,302.

1. In a silencer for an internal combustion engine and the like, a gas inlet pipe, a series of annular chambers with closed ends surrounding said inlet pipe and so spaced as to leave air cooling spaces between them, inlet and outlet ports being formed near opposite ends of said chambers, each of said chambers comprising an inner cylindrical body with outwardly flared or upset ends and an outer cylindrical body with inwardly pressed or necked ends, radially extending conduits between said pipe and the inlet port of the first of said chambers, and radially extending conduits connecting the outlet ports of each of said chambers except the outer one to the inlet ports of the next adjacent chamber.

1,009,224. Automobile Fender. William B. Cole, Chicago, Ill., assignor of one-half to Ernest M. Warffuel, Chicago, Ill. Filed June 16, 1911. Serial No. 633,500.

1. In an automobile, a pair of vertically disposed guide angle irons mounted at the front of said automobile, the webs of said angle irons extending outwardly and forwardly, a pair of transversely extending bars having U-shaped lugs embracing said outwardly extending webs of said angle irons, and a fender mounted on said bars, substantially as described.

1,009,226. Vehicle Wheel. Frederic W. Damitz, Pe Ell, Wash. Filed Feb. 14, 1911. Serial No. 608,506.

The combination with a vehicle axle, of an inner hub sleeve arranged upon said axle, inner and outer circular plates arranged upon the opposite ends of said sleeve, said inner plate being of less diameter than the outer plate, an outer hub ring radially movable between the opposed faces of said plates, a circular plate rigidly secured at its periphery to said ring and having a sleeve arranged in spaced relation to the vehicle axle, said inner plate being movable between said circular plate and said ring, said sleeve and outer ring each having a plurality of annular grooves in their opposed surfaces and transverse openings communicating with said grooves, a plurality of pins having heads upon one of their ends disposed in said grooves and movable through said transverse openings to insert or remove the same, and cushioning springs connected at their ends to the pins in said sleeve and ring.

1,009,284. Automobile Tire. Franklin M. Crispin, Beverly, N. J., assignor of one-half to John W. Hamer, Beverly, N. J. Filed Aug. 31, 1909. Serial No. 515,424. Renewed Aug. 29, 1911. Serial No. 646,689.

1. In a device of the character stated, an outer tire casing, a demountable support therefor, the support and tire being apertured at intervals, rods upon opposite sides of the center of said tire, and within it, bands mounted upon said rods, a holding member for said casing having outwardly diverged sides, and means co-operating therewith for forcing said rods radially and outwardly to expand the bands within the tire casing, the actuating portions of said means being accessible through said apertures.

1,009,314. Resilient Wheel. Isaac Jay, Pendleton, Ore. Filed Apr. 12, 1911. Serial No. 620,581.

1. A resilient wheel comprising in combination a rim, a plurality of pairs of U-shaped pieces disposed back to back on the interior of said rim, a plurality of resilient spokes having their end portions connected to a pair of said U-shaped pieces, and a hub for holding the inner portions of said spokes.

1,009,336. Running Gear for Vehicles. Isaac E. Palmer, Middletown, Conn. Filed Jan. 8, 1908. Serial No. 409,752.

In running gear for vehicles, the combination with front steering wheels, of a truck for supporting the rear of the vehicle, a truck wheel being arranged to tilt toward and away from the longitudinal axis of the vehicle, a drive shaft, a spur gear on the hub of said tilting wheel, a spur gear supported on the truck frame and intermeshing with the gear on the said hub, and intermediate gear for connecting the spur gear on the truck frame with the drive shaft, the said spur gear on the truck frame being arranged directly above the spur gear on the hub of said tilting wheel.

1,009,337. Shock Absorbing Device. Luther A. Peckham, Edgewood, R. I. Filed Feb. 8, 1911. Serial No. 607,334.

1. In a shock absorber two relatively movable members, one of said members having a relatively long slightly inclined cam portion terminating in a higher more sharply inclined portion, the other member having an inclined surface complemental to the respective cam portions of the first member, the second member also provided with a depression wider than the higher cam portion of the first member and receiving the same, whereby relative movement of said members effects a first or gradual frictional resistance and subsequently a rapidly increasing frictional resistance to the relative movement of said members.

1,009,347. Vehicle Wheel Rim. Edwin Coupland Shaw, Akron, Ohio, assignor, by mesne assignments, to The United Rim Company, Akron, Ohio, a Corporation of Ohio. Original application filed Jan. 6, 1906, Serial No. 294,831. Divided and this application filed Jan. 29, 1907. Serial No. 354,619.

1. Means for locking a removable cross-split tire flange to a vehicle wheel rim, comprising co-operating locking means formed integrally in the terminals of the said flange and upon the rim, substantially as set forth.

1,009,364. Tire Construction. Paul E. Wirt, Bloomsburg, Pa. Filed Aug. 11, 1909. Serial No. 512,399.

A tire having a puncture-resisting member formed of sheet material gathered into a succession of closely compacted folds presenting outer bights toward the wearing surface, said folds being graduated in height so as to diminish in height toward the sides of the tire structure, and an outer covering bonded onto said outer bights.

1,009,365. Process for Tire Construction. Paul E. Wirt, Bloomsburg, Pa. Filed Apr. 11, 1910. Serial No. 554,840.

1. A process for making a puncture-resisting part for tires, which consists in first preparing a fabric body material in sheet form, then gathering the said material into a folded formation, and subjecting the latter to compression upon its bights.

1,009,368. Antislipping and Antiskidding Attachment for Tires. Charles B. Woodworth, Niagara Falls, N. Y. Filed Dec. 21, 1910. Serial No. 598,486.

1. In an anti-slipping and anti-skidding attachment for tires, a tread plate which is substantially concavo-convex in cross section and has curved side edges located substantially in the same plane whereby they are adapted to bear throughout their length on a flat surface, said plate being adapted to be secured on the tire with its concave face against the tire and its side edges extending transversely of the tire, substantially as set forth.

1,009,382. Automobile Tire Pump. George A. Collison, Burlington, Vt. Filed Mar. 10, 1911. Serial No. 613,563.

1. In a pump attachment for automobiles, the combination of a gear adapted to be fixed to a driving shaft, an arm pivoted coaxial with said gear, a second gear journaled on said arm, a pump cylinder, and a pitman connection from said second gear to the pump cylinder.

1,009,385. Headlight Adjuster. Frank R. Cunningham, Medford, Mass., assignor to Kendrick and Davis Company, Lebanon, N. H., a Corporation of New Hampshire. Filed Dec. 7, 1909. Serial No. 531,845.

1. In combination with a motor vehicle and the latterally movable steering wheels thereof, a lamp mounted with provision for horizontal oscillative movement, an arm connected with one of said wheels so as to have lateral angular movements similar thereto, and an intermediate connecting rod having universal pivotal connection with said arm and a universal pivotal connection with said lamp at a point in line with the axis of oscillative movement of the lamp, whereby it is rotated about its own axis by angular movements of said arm and transmits such rotation to the lamp.

1,009,424. Clutch. Fred A. Law, Hartford, Conn., assignor, by mesne assignments, to The Columbia Motor Car Company, Hartford, Conn., a Corporation of Connecticut. Filed Apr. 8, 1902. Serial No. 101,898.

1. The combination of a pair of friction clutch surfaces respectively embodied in a main clutch member and a second clutch member, means for moving said surfaces into and out of complete engagement with each other and independent driving friction clutch surfaces including members projecting through the main clutch member adapted to engage before the engagement of the first named surfaces.

1,009,435. Transmission Mechanism. Ralph L. Morgan, Worcester, Mass. Filed Feb. 26, 1910. Serial No. 546,245.

1. In a transmission mechanism, the combination of a driving shaft, differential gearing connected therewith, a jack shaft and a concentral sleeve driven by the differential gearing, power transmitting devices longitudinally and laterally fixed on the jack shaft and sleeve respectively, and removable means for positively locking the power transmitting devices together.

1,009,454. Shock Absorber. Harry C. Turner, Los Angeles, Cal. Filed Aug. 21, 1907. Serial No. 389,440.

1. In a shock absorber a stationary case, a revoluble sleeve mounted in said case, a screw cap adapted to close said case and through which said sleeve projects, means mounted on the outer end of said sleeve to rotate the same, a revoluble member in said case connected to said sleeve by ratchet means, friction plates mounted on each side of said revoluble member, one of said fric-

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tion plates bearing against the stationary case, a stationary plate bearing against the outer face of the other of said friction plates, said stationary plate having a transverse movement to and from said friction plate but being prevented from rotation, and an annular spring between said stationary plate and said cap, adapted to be pressed by said cap against said stationary plate and hold said friction plates and said revoluble member in engagement with each other.

1,009,529. Vehicle Wheel Rim. Edward H. Koken, Akron, Ohio. Filed May 18, 1911. Serial No. 628,087.

1. A vehicle wheel embodying a circumferential rim having the lateral faces thereof inwardly beveled, the outer face of said rim constituting a tire seat, a pair of tire-retaining bands comprising split rings positioned on opposite sides of said rim, the outer portions of said bands formed to engage the base portion of a tire and their inner lateral portions beveled to engage the beveled side faces of said rim whereby when said bands are forced transversely toward each other the beveled portions of said bands and rim will engage causing thereby a contraction of the former, and a pair of annular clamping bands arranged to engage the outer lateral faces of said retaining bands for drawing the latter toward each other and simultaneously contracting the same on said tire.

1,009,586. Antifriction Bearing. Otto Alwin Schmidt, Chelmsford, England, assignor to The Hoffmann Manufacturing Company, Limited, London, England. Filed Sept. 15, 1910. Serial No. 582,218.

In an anti-friction bearing, the combination of an annular housing having a spherical seat at a right angle to the diameter thereof, an outer race ring of less width than the housing and having an outer spherical surface adapted to be forced into contact with the spherical seat of the housing, the spherical seat of the housing being recessed at diametrically opposite points to receive the outer race ring, and inner race ring, anti-friction balls between said rings, and dust washers having curved edges corresponding to the spherical seat of the housing whereby they can be forced at right angles to their diameters into said spherical seat and retained thereby when in normal position, substantially as described.

1,009,591. Tire Holder. Nils P. Sjoholm, St. Louis, Mo. Filed Oct. 3, 1910. Serial No. 585,065.

1. A tire-holder comprising a vertically disposed standard provided at its lower end with means for securing it to the running board of an automobile, a cross-arm on said standard, a supporting means on said cross-arm provided with approximately yoke-shaped members which are adapted to engage the inner side of the tire, means for enabling said yoke-shaped members to be adjusted toward or away from the standard, and offset portions on said supporting means which enable said yoke-shaped members to be adjusted vertically so as to accommodate tires of different diameters.

1,009,599. Valve for Internal Combustion Engines. Charles N. Teetor, Hagerstown, Ind. Filed Aug. 17, 1911. Serial No. 644,699.

1. In an internal combustion engine, the combination with the valve casing, piston and cylinder, of a valve adapted to reciprocate in the valve casing and having delivery ports therein, a slide mounted on said valve and adapted to be carried with it through a portion of its stroke, and means to limit the movement of said slide to a fixed space whereby said delivery ports are closed to the cylinder by said slide throughout the stroke of the valve during which the compression and power strokes of the piston are taking place, said valve capable of continuing its strokes after the slide is arrested for the purposes specified.

1,009,642. Metallic Wheel. Martin R. Bruner, Wapakoneta, Ohio. Filed Apr. 16, 1909. Serial No. 490,400.

In a wheel having a hub provided with a threaded portion having an annular convoluted plate, the hub having a convoluted washer fitting the threaded portion and provided with a nut threaded on the threaded portion against the washer; the wheel comprising a single sheet metal plain disk through which the threaded portion penetrates; annular rings secured on each face of the disk adjacent to the periphery thereof, and constructed to form an annular groove; the disk having spokes pressed in opposite directions, therein, and tapering outwardly from the hub, the outer ends of the spokes serving as shoulders terminating short of the annular rings to withstand the strain on the periphery of the disk, and to act as abutments for the rings.

1,009,720. Vehicle Wheel. Jasques Bustanoby, New York, N. Y. Filed Aug. 18, 1908. Serial No. 449,011.

1. In a wheel, a central body, in combination with a rim made of channeled segments each detachable individually from said body, tire sections each fitted to one of the rim segments, and a shield interposed between each rim segment and the corresponding tire section, the edges of the shields being located within the curved channel-forming edges of the rim segments.

1,009,781. Tire Tool. Peter J. Nolan, Chester, Pa. Filed Aug. 15, 1910. Serial No. 577,338.

1. A device of the class recited comprising an element provided with members for engaging wheel spoke and rim parts, said element having relatively fixed relation with said parts and serving as a fulcrum for the movement of an operating handle, a jaw capable of encircling and engaging the rim of a tire shoe having hinged relation with said element, an operating handle pivotally supported by said element and serving as a lever for controlling said jaw and means operatively connected between said jaw and said handle for moving the jaw about its hinged point.

1,009,850. Vehicle Wheel. Ira W. Misensol and Martin Boyer, Lowry, Minn. Filed Feb. 18, 1911. Serial No. 609,320.

In a vehicle wheel, a hub formed with transverse slots, the circumferential surface of the hub at points between the slots being eccentric to the axis of the hub, the distance between the axis and the circumferential surface of the hub at one side of each slot being less than at the other side thereof, cushioning springs having tang portions fitted in the slots, the bodies of the springs projecting over the circumferential surface of the hub between the slots, an annulus surrounding the hub and cushioned by the springs, two concentric rims, and spokes carried by the rims and having their inner ends projecting within the inner concentric rim and bearing against the annulus.

1,009,931. Automobile Lock. Walter G. Sachs and Charles W. Landers, San Francisco, Cal. Filed Nov. 28, 1910. Serial No. 594,456.

1. An automobile lock comprising a lock-supporting arm having a hub adapted to be secured concentric with a steering post, said arm having a socket in its outer end, and a lock case fitting said socket and having a hasp to detachably lock a steering wheel to said arm.

1,010,054. Gear Changing Device. Allen M. Irish, Bath, Me. Filed Dec. 15, 1910. Serial No. 597,399.

1. In a combined clutch and gear shifter,

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the combination of gear shifting means, means for supplying an operating fluid to said shifting means, a valve for controlling the fluid supplied to said gear shifting means, a clutch, fluid operating means for releasing said clutch, a valve for controlling the supply of fluid to said clutch releasing means, and means connected with said valves for releasing the clutch before a gear change can be made.

1,009,942. Automobile Wheel. Clarence W. Tompkins, Brookfield, Mo. Filed Sept. 16, 1910. Serial No. 582,420.

A resilient vehicle wheel comprising a hub, radial spokes, telescoping cylinders secured on the ends of the spokes, a corrugated spring carried within said cylinders secured at its opposite ends to the opposite telescoping cylinders, a channeled felly, roller bearings secured on the outer ends of said telescoping cylinders and carried in said felly against rotation on said rollers, substantially as described.

1,010,014. Emergency Tire for Automobile Wheels, Etc. William Budesheim and Jefferson D. Stinchcomb, Baltimore, Md., assignors to William F. Beasley, Plymouth, N. C. Filed Dec. 7, 1910. Serial No. 596,079.

1. An emergency tire comprising tire sections, a tread surface upon each section, clencher plates fastened to the opposite faces of the sections, the ends of said plates being bent over the ends of said sections, a headed lug at the end of one section and a slot at its other end adapted to receive a headed lug of an adjacent section to hold the sections ogether, and means for drawing and holding the connected sections frictionally against the circumference of the rim of a wheel.



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AUTOMOBILE DEALERS—Finest location in the city for auto truck garage, over 12,000 sq. ft. of land, facing on 3 streets. Price and location of HENRY W. SAVAGE, 129 Tremont St., Boston, Mass.

FORD OWNERS—GET OUR CATALOG. AUTO PARTS CO., PROVIDENCE, R. I.

MAILING LISTS—750,000 auto owners. S. H. CARROLL, JR., Albany, N. Y.

FOR SALE—1912 new Flanders Suburban 3-speed, 4-pass., removable rear seat. Mitchell Baby Six. BOX 104, Thompsontown, Pa.

FOR SALE—Garage and general repair shop in city of 30,000. 400 autos in county. A bargain. Address IOWA, care Motor World.

PISTON RINGS. ALL SIZES. FITTING BY EXPERTS FREE. THIRTY CENTS EACH. MERRITT COMPANY, 409 East 31st St., NEW YORK. 'Phone 585 Madison Square.

$9 for slightly used gas tank; $15 for 32 x 3½ inch slightly blemished Diamond tire; also windshield in good condition for $4; Blue Ribbon Polish on sale at 79c. per gallon. STRAUSS, 707 Main St., Buffalo, N. Y.

FOR SALE—1¼-inch Schebler carburetter, $3; horn, $1.50; foot lathe, $5; automobile, $75. HATHORN, rear 98 Joiner St., Rochester, N. Y.

SALESMEN, one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. STURDY MFG. CO., 2637 Michigan Ave., Chicago, Ill.

DELIVERY Wagons and Trucks; genuine bargains. Six months' guarantee on commercial vehicles, whether it is the baker, butcher, grocer, laundry or any other business; whether you want to carry up to 1,000 pounds or 10,000 pounds; our study for the past seven years of commercial cars places us in position to give you the right car at the right price; we have light delivery wagons and trucks from $200 up. AUTO TRADE CO., 509-511 7th Ave., New York.

QUEEN Model K 30 transmission in good condition with new gears, exceptionally cheap. Good buy for anyone who would care for additional repair parts. WESTERN MOTOR CO., Marion, Ind.

BROKEN CRANKSHAFTS. cylinders, crankcases, flywheels, gear teeth, pistons, perfectly welded and machined ready to replace. Guaranteed and references. Machinery up to 5 tons welded. ATLAS WELDING WORKS, 74-76-78 Irving St., Rahway, N. J.

COX CRANKLESS STARTER.
Don't bother cranking your car. Get a "Cox" Crankless Starter and save trouble all year around. Guaranteed to start every time. Price:
4 Cylinder $30
6 Cylinder $35
Send for circular.
A. G. EIBEN, AGT.,
905 Arrott Bldg. Pittsburgh, Pa.

MOHAIR—DUCK—CANVAS—TOPS
PEERLESS AUTO TOP DRESSING
restores the faded top to its original color. A leaking top is waterproofed with one coat. It does not stiffen or harden to break when the top is folded. Anyone can apply it. Sold all over the country by Garages and Supply Dealers. Price: 1 gallon can, $3.75; ½ gallon can, $1.90; ¼ gallon can, $1.00.
THE COLUMBUS VARNISH CO.,
Columbus, Ohio.

BEARINGS
Ball and Roller—All Types
For American or Foreign Cars
and Motor Boats.
Distributor of
"F & S" New Departure
Standard (S. R. B.)
We Also Carry Other Makes.
THE GWILLIAM COMPANY
Broadway and 58th St.,
New York.
'Phone Columbus 8356.

ARE YOU in need of any additional help in any department of your business? Are you out of employment or looking for a better connection? Have you second-hand apparatus of any kind or do you want to buy second-hand material? Have you a factory site for sale or do you want to buy one? If so, use the Want and For Sale column of the Motor World. Seven words to the line, fifteen cents a line. Advertisements can be inserted over a number when it is desired and the identity of the advertires will be kept confidential.

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"The paper that is read, not merely looked at"

furnishes the strongest dollar-for-dollar advertising value ever offered to the manufacturers of

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Every manufacturer who is looking for more and better trade outlets will find the investigation of this proposition interesting from a profit bearing standpoint.

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Always Ready to Repair the Inner Tube



Patent Pending — Nickel Plated

The simplest, easiest, surest way. A little rubber and one ounce of gasoline.

The Imperial Vulcanizer Repair Kit

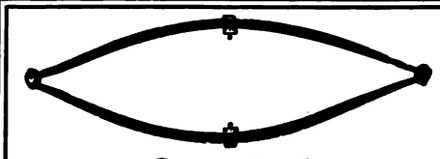
Price $3.50

At your dealers, or sent by express.

Guaranteed to Satisfy

Address Dept. E.

THE McGRAW TIRE & RUBBER CO.
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Guaranteed Automobile Springs

Our plant is devoted exclusively to the manufacture of high quality springs. All work is oil tempered and warranted. Our circulars contain valuable information. Write.

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The Bush Radiator
THE BUSH MANUFACTURING CO.
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Mosler Spit-Fire Are The Best

THE MOTOR CAR EQUIPMENT CO.
The Only Exclusive Wholesale Automobile Supply House
Write for Our Complete Catalog and Revised Discount Sheet
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Does Your Gas Line Leak?

Don't know, do you? Test it and then you WILL know. The A-A Gas Leak Detector will show you in a minute.

No trouble to operate. Just pull tubing from lamps and insert detector in their place; turn on enough gas to inflate bulb to about 3 in. or 4 in.; then turn off gas. If bulb goes down, there is a leak which may be found by applying soap suds to all joints.

Probably 25% of all gas is wasted by leakage. Think what that means in dollars and cents. Don't lose YOURS; save it. You may need your gas some dark night.

Send 25 cents, coin or stamps, to Dept. C for the A-A Gas Leak Detector.

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Send Us Your Inquiries When in the Market for

Sheet Metal Stampings

Estimates Cheerfully Furnished

The Bossert Company
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Perfection Spring Company
SPECIALISTS IN
Spring Suspension
High Grade Only
Cleveland, Ohio

GOODYEAR

This Name on Automobile Tires and Rubber Accessories Signifies Inherent Qualities of Material and Workmanship that Insure the Maximum of Service at the Minimum of Expense. (349)

The Goodyear Tire and Rubber Co., Arthur St., Akron, O.



Stop Fussing with Tires

Quit quit the everlasting repairing!—the agony of punctures, blowouts, and delays. Enjoy unrestricted pleasure—always, always—with

DAYTON AIRLESS TIRES

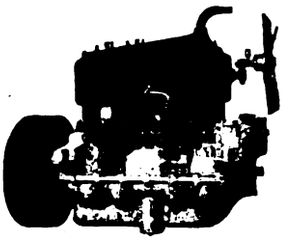
Air-Free—Care-Free—cannot give out. They save any motorist hundreds of dollars. Send now for big FREE BOOK of money-saving, pleasure-making information you need now. You can't get it quick enough. Splendid dealers' proposition.

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Absolutely Proof Against Every Trouble

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Guaranteed 5000 Miles
Ajax-Grieb Rubber Company
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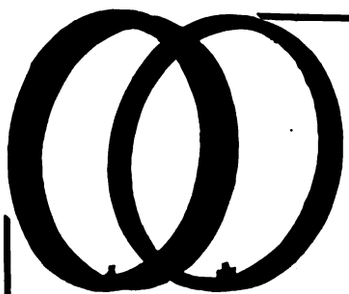
"CONTINENTAL"



Best known motor in America.
Look for the name "Continental" on the crank case.
We have looked after the quality behind it.
4 and 6 Cylinders
20 to 60 H. P.
Continental Model "C" — *Write for Booklets*

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FACTORY REPRESENTATIVES:
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A Word to the Manufacturer

MarshQuick Detachable and Universal Tire Rims, from $3.00 to $8.00 per set. Save 40 per cent. Patent locking device to prevent the rings from flying off.

HOWARD DEMOUNTABLE RIM COMPANY, Trenton, N. J.

THE ATWATER-KENT IGNITION SYSTEM
ATWATER-KENT MFG. WORKS
46 North Sixth St., Philadelphia Pa.

FISK
Heavy Car Type Automobile Tires
Pure Para Inner Tubes

GEARS
TRANSMISSION, TIMING, BEVELS, HELICALS, WORM
Every gear has a guarantee.
GRANT LEES MACHINE CO.
CLEVELAND



Red Head
REGISTERED U.S.PAT. OFFICE

Magneto Plugs coax maximum power out of engine.
EMIL GROSSMAN COMPANY, Mfr., New York and Detroit

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Weed Chains

The Great Anti-Skid DEVICE



Nine-tenths of all accidents to automobiles are caused by skidding or slipping.

Either you skid into the "other fellow" or the "other fellow" skids into you.

No matter how careful a driver you may be, you **cannot prevent skidding** or slipping on wet, muddy snow-covered roads or on icy, slippery greasy pavements unless you equip your car with **Weed Chains.**

Cannot Injure Tires

Because They Creep

An absolute necessity on both rear wheels and if you want to know what real steering steadiness means put them **on the front wheels too.**

For your own safety—for the safety of the public, **fully equip** your car with **Weed Chains.** Make it **your business** to get a set today.

Recommended and sold by all reputable dealers

Weed Chain Tire Grip Co.
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The Name "Weed" on Every Hook

Jencick Motors

OF QUALITY

For Motor Trucks

Jencick Motor Corporation

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The NIAGARA Self Starter
Is "As Dependable as Niagara"
Simple as It Is Efficient
Good Territory Open
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All Standard Bearings
are fully described in our
New Catalog 24 A
Send for it.
Standard Roller Bearing Company
PHILADELPHIA

INVADER OIL
"The Best the World Affords"
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Reo the Fifth
Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 38 horsepower four cylinder car of modern refinements priced for the present at only $1,055.
(38) **R. M. OWEN & CO., General Sales Agents**
RCO MOTOR CAR CO., Lansing, Mich.

Woodworth Treads
will help you to increase your business while benefiting your customers. We will send any responsible dealer a pair on 30 days' trial. Write now.
LEATHER TIRE GOODS CO., Niagara Falls, N. Y.

Auto-Top Fabrics
OF EVERY DESCRIPTION
SAMPLES AND PRICES ON REQUEST
L. J. MUTTY CO., Boston

$495.00 METZ 22 H. P. MOTOR CAR
The most economical car you can buy at any price. The Metz will run from 28 to 32 miles on a gallon of gasoline, over 100 miles on a pint of lubricating oil, and from 8,000 to 10,000 miles on a set of tires. You can secure exclusive sale of these cars in your territory. Book "B" mailed free on request.
METZ COMPANY, Waltham, Mass., U.S.A.

75% Increase in Tire Efficiency
That's what the INNERSHU accomplishes. It's a tough, durable, rubberized fabric formed permanently to tire shape. Ask for circular.
INNER SHOE TIRE COMPANY
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Locomobile Cars for 1912
Complete information furnished on request.
The Locomobile Company
BRIDGEPORT, CONN.



MOTZ Cushion Tires
For Pleasure Cars and Light Delivery Cars
Send for Booklet 58
THE MOTZ TIRE AND RUBBER CO.
Executive Office: Akron, Ohio
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Distributors for New England States

A—Shows *double*, notched treads.
B—Shows undercut sides.
C—Shows slantwise bridges.
D—Shows absorbing means when passing over an obstruction.

We Specialize on
Finishing Crank Shafts
Only.
MICHIGAN CRANK SHAFT CO.
Lansing

TRUFFAULT-HARTFORD
Shock Absorber
HARTFORD SUSPENSION COMPANY, 184 Bay St., Jersey City, N. J.
EDW. V. HARTFORD, Pres.
New York, 212-214 W. 88th St.; Boston, 319 Columbus Ave.; Chicago, 1458 Michigan Ave.; Philadelphia, 250 North Broad St.; Detroit, 870 Woodward Ave.

Aluminum Bodies
THE SPRINGFIELD TOP
(Pat. 1895)
SPRINGFIELD METAL BODY CO.
366 Birnie Avenue, Springfield, Mass.

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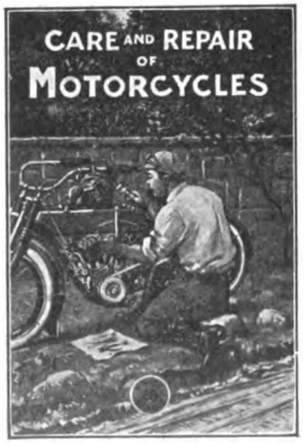
A trouble saver for the motorcyclists



This book contains more practical advice for the rider, more good hard sense, more suggestions as to how to keep out of trouble, and how to get out of it, than has ever been printed heretofore in any one book.

¶ It fits the coat pocket and it includes free engine clutches, two-speed gears, mechanical lubricators and magnetos, together with special matter on motors, valves, carbureters, fuel and important general subjects, all plentifully illustrated.

¶ Dealers and jobbers in all parts of the country are selling "Care and Repair of Motorcycles" to both new riders and veterans as the best aid in correcting and avoiding motorcycle trouble.



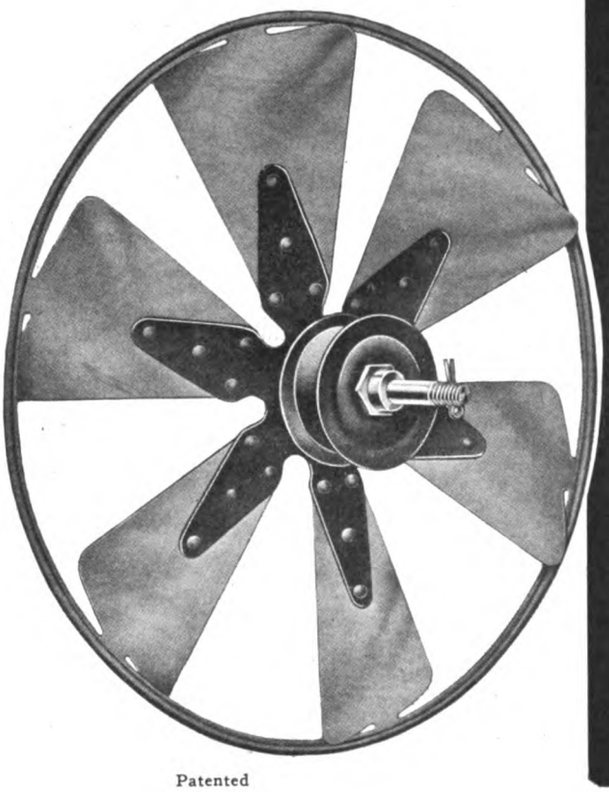
Sent Postpaid on Receipt of 25 Cents

Special Rates to Jobbers and Dealers on Quantity Orders.

BICYCLING WORLD COMPANY
1600 Broadway **New York**



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1000 Daily

One-Piece Blade Radiator Fans

Protect yourself where deliveries are assured, quality right and a saving made because of an assortment of standard parts from which you may draw.

We Are Fan Specialists

The Sparks-Withington Co.

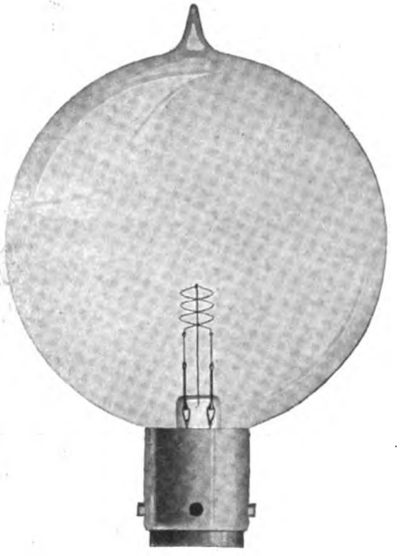
JACKSON, MICHIGAN WALKERVILLE, CANADA

When You Buy Lamps

You want good ones—naturally.

You also want lamps that give you the brilliant white light characteristic of all Mazda lamps and in addition you want them to stand vibration without breaking and to burn up to full candle power without excessive current consumption.

One lamp will do all these—You can be sure of getting this lamp if you



FEDERAL MAZDA

This is the Label

Look for the Label

which is found on the bulb of every "Federal" Mazda.

Dealers who count satisfied customers as their best business asset are carrying Federal Mazdas regularly in stock.

And they are making more money because each lot of lamps is uniform with former lamps and customers come back for more when once they have used "Federals."

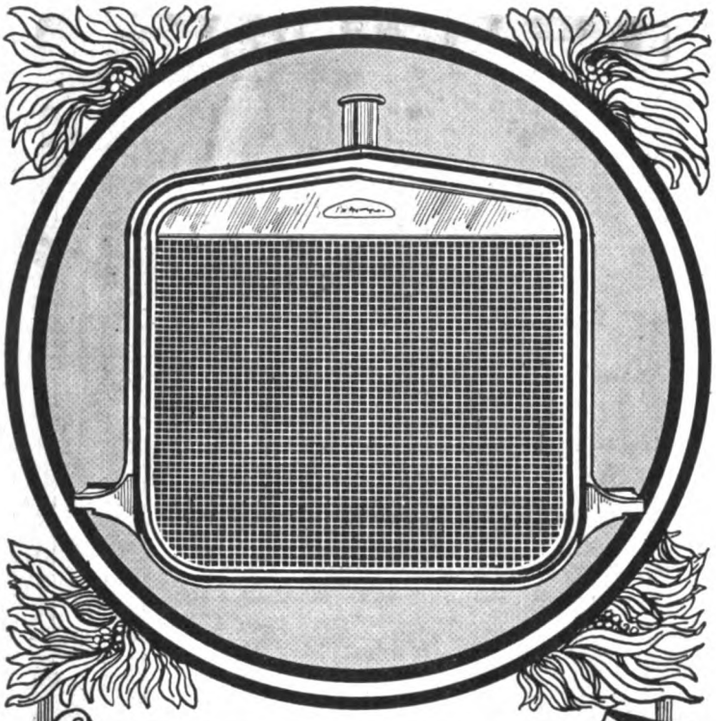
Write for Bulletin No. 12 and dealer's contract.

FEDERAL MINIATURE LAMP WORKS

of the General Electric Co.

Main Office, Cleveland, 812 Hippodrome Bldg. **Chicago Branch, 301 Fort Dearborn Bldg.**

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FEDDERS
Automobile Radiators

FEDDERS Square Tube Radiators mean that the manufacturers using them are giving the greatest radiator efficiency to their customers.

¶ Viewed from any angle Fedders Square Tube Radiators with all four sides surrounded by water represent the greatest value to the car owner.

Wont you let us tell you why, in detail?

Fedders Manufacturing Works

BUFFALO, NEW YORK

The ONLY Starter Plug

It was almost impossible to put the simple, successful acetylene gas starter on cars without petcocks UNTIL THIS new plug was perfected.

NOW you can put a self starter of the type of the DISCO on FORDS, BUICKS, ELMORES, and all cars whether they have petcocks or not. This is the ONLY STARTER PLUG. Patents pending.

Takes the place of all other spark plugs. Gives splendid ignition results—withstands heat, is soot proof and easily accessible for cleaning and inspection.

Look For This Trademark



on every box.

FOR SALE TO EVERYBODY
FOR SALE BY EVERYBODY

You can buy the STARTER PLUG from any live dealer. Price $1.50 each. We will quote prices and terms to manufacturers, jobbers and dealers. Write us.



Patents Pending

IGNITION STARTER CO.
Spark Plug Department
615 Dodge Building Detroit, Mich.
Largest Makers of Self Starting Devices in the World

Lauth-Juergens

Lauth-Juergens Trucks are Delivery Insurance

QUALITY DURABILITY

One, Two and Three Ton Capacity

LAUTH-JUERGENS TRUCKS ARE THE LATEST IN construction, most powerful in operation and the motors are guaranteed against defective workmanship and material for the life of the truck. They are positively the highest class trucks made. Two cylinder, one-ton, four cylinder, one, two and three-ton. Four speeds forward. Hess-Bright ball bearing transmission made in our own shops of the finest tool steel, three-piece disc clutch, covered by patents owned by us. Send for 1912 Catalog and specifications. Prompt delivery on all models. Large publicity campaign just begun. Our quality will do the rest.

Reliable Agents: Secure Your Territory for 1912 at Once.

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NEW YORK—West Side Garage & Motor Co., 160-162 101st St.
CHICAGO—The Lauth-Juergens Motor Car Co., 2630-32 Wabash Ave.
NEWARK, N. J.—Merchants Motor Car Co., Essex Building.
DETROIT, MICH.—Bierl Auto Truck Sales Agency, 453 Dix Ave.
DISTRICT OF COLUMBIA AND VICINITY—Bowles Motor Sales Co., Inc., 1608 14th St. N. W., Washington, D. C.

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Mr. Automobilist:

Your tire maker is very anxious to impress upon you the importance of

Tires Inflated to the Right Pressure

He insists that this is tire economy and

Saves You Money

How do you know what pressure you have in your tires? A

SCHRADER
UNIVERSAL
Tire Pressure Gauge

(Trade Mark Registered in U. S. Patent Office)



(Patented March, 1898—Other Patents Pending)

will tell the exact pressure in your tires at any time, day or night, by simply holding this Gauge to your Valve for a second. Its recording sleeve remains in place, showing the exact pressure in the tire so that the Gauge can be taken anywhere and read, at night to the front of the car into the light of the lamps. After the pressure has been ascertained the Indicating Sleeve can be pushed back into the Gauge with your finger. No catches or snaps to operate or get out of order. This Gauge is 2½ inches long over all, short enough to apply easily to the smallest diameter of wheel and can easily be carried in the vest pocket or the change pocket of your trousers.

Price $1.00 Each
Ready for Delivery Now

Guaranteed Simple and Absolutely Accurate

Can be obtained from all tire manufacturers and the dealers, or

A. SCHRADER'S SON, Inc.
28-32 Rose Street New York City

A TWITCHELL AIR-GAUGE at $1.00 or A NEW SET of TIRES at $100.00?



Statistics show that 26 per cent. of all tire trouble is caused by improper inflation.

Statistics show that you can take one thousand miles of service out of a set of tires by driving them partially inflated over ten miles of road. This means you can only get Big Mileage out of tires inflated to the right pressure.

The Twitchell Air Gauge

tells you in a minute if your tires are properly inflated. That is why the TWITCHELL AIR GAUGE is tire insurance; that is why it is a guarantee of maximum tire efficiency.

You simply apply the gauge to your valve and the indicator shows your tire pressure. A stop holds the indicator in place till you release it. On every gauge is a table of pressures different size tires require.

Price $1.00 Each

Now Ready for Shipment
Can Be Obtained From Your Dealer

Twitchell Gauge Co.
1256 South Michigan Avenue
CHICAGO, ILL.

BENZ

¶Since the introduction of BENZ cars to the motoring public of America, agencies have been desired, in fact, coveted by many. We are now in a position to offer agency propositions to responsible parties. ¶Also makers of the famous BENZ-GAGGENAU six ton trucks. Choice territory open for agents. Write us today for full details.

BENZ AUTO IMPORT COMPANY OF AMERICA
250 West 54th Street, New York
Direct Branch of BENZ & CIE., Mannheim, Germany

Self Hanna Starter

Watch the Prices Drop!

Just as the Hanna self starter—the only 100% efficient self starter that does not foul or soot your plugs—was imitated by those who followed our lead so now is the price of the Valentine manifold starter being met.

Remember We Were the Originators

Not only were we the first to produce an acetylene self starter but we were first to introduce a manifold self starter at the right price, $10.

Our Price Does Not Cut the Dealer's Profit

Still some fine territory open. The profit is big. Our goods are right and fully guaranteed. Write today.

J. H. VALENTINE COMPANY
Syracuse, New York

The Valentine MANIFOLD STARTER and Gas Lighter

Great Northern Hotel
CHICAGO

Ideal Headquarters for Automobilists

Rates:
Without Private Bath
$1.50 and $2.00
With Bath
$2.50 to $4.00



Large, Comfortable Rooms
Grill Room Popular Prices
Cafe on Parlor Floor

Service and Appointments Most Approved

Most centrally located hotel in Chicago and absolutely of fireproof construction.

Jackson Blvd., Dearborn and Quincy Sts.
JOHN C. ROTH, Managing Director

They Barred the Franklin Out

The Quaker City Motor Club of Philadelphia conducted an economy run for motor cars April 27, open to all pleasure cars with the exception of air-cooled cars.

What They Did

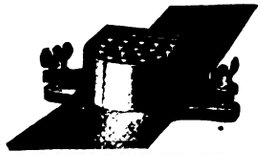
In the Quaker City contest, open only to water-cooled cars, first prize for economy was awarded to a two-passenger car that averaged 22.7 miles per gallon of gasoline.

What the Franklin Has Done

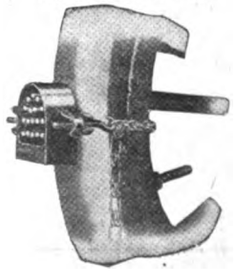
46.1 miles on one gallon of gasoline in the economy contest conducted by the Automobile Club of Buffalo.

87 miles on two gallons of gasoline in the economy run held by the Automobile Club of America.

FRANKLIN AUTOMOBILE COMPANY, Syracuse, N. Y.



Repairing Inner Tube



TIRE CUTS ruin casings. They admit moisture to the carcass, cause the fabric to rot and weaken, grow larger—end in blowouts.

You can repair **CASINGS** and **INNER TUBES** anywhere in 15 minutes, better than a Repair Shop can do—and for *one cent.*

Universal Auto-Vulcanizer
Patented

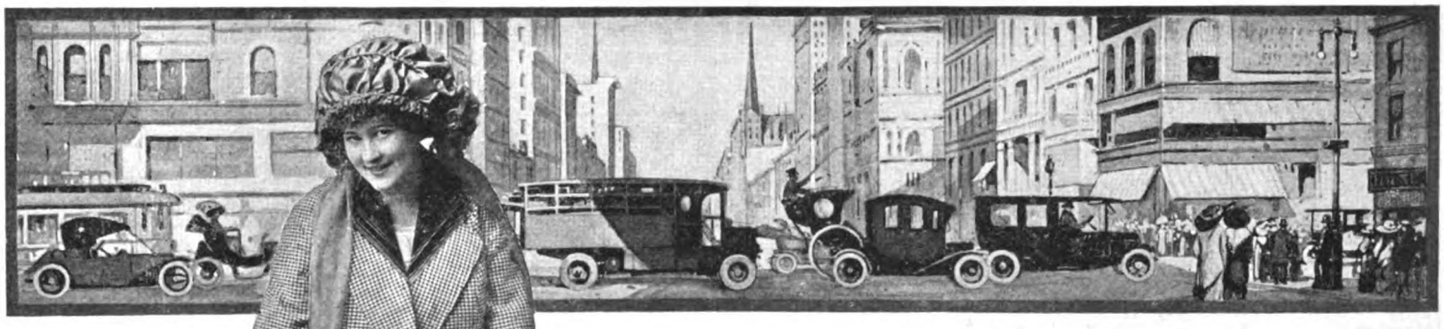
A practical vulcanizing outfit complete, with enough repair gum to make 40 patches. It weighs 3 pounds and can be carried in the tool box. **Simplest and most satisfactory device for eliminating tire troubles that has ever been devised.**

Absolutely automatic. Place the patch—attach the Vulcanizer—put in the gasoline—light it. No further attention required. In 15 minutes the job is done.

It *can't burn, scorch* or *injure* tube or casing. It *can't* get out of order. It *can't* fail to do its work. So simple, anyone can operate it. The Universal Auto-Vulcanizer saves its cost a *hundred times* over in trouble and expense.

Price Complete. **$4.00** Ready for Instant Use
Guaranteed Satisfactory or Money Refunded
ADAMSON MFG. COMPANY, East Palestine, Ohio

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Kelly-Springfield Tire Company
20 Vesey St., New York

Branch Offices in
New York
Chicago
Philadelphia
Boston
St. Louis
Detroit
Cincinnati
San Francisco
Los Angeles
Cleveland
Baltimore
Washington
Seattle
Atlanta
Akron, O.
Buffalo

Boss Rubber Co. Denver, Colo.
Appel & Burwell Rubber & Tire Co. Dallas, Texas
Todd Rubber Company New Haven, Conn.
Bering Tire & Rubber Co., Houston, Texas

We argue that a good, honestly made tire doesn't need to be anything else

The Kelly-Springfield Automobile Tire

has no special features—no devices that prevent this, accomplish that, or assure the other thing.

It is just a tire—but a tire backed by 17 years of tire-making experience—a tire that will, if treated right, give you more mileage and less trouble than any tire you ever used.

There were Kelly-Springfield Tires before there were automobiles. They were not pneumatics, but they were tires of rubber and tires for vehicles, and they so successfully met conditions then existing that a majority of all tires used on carriages were Kelly-Springfields.

Experience in tire making is as important to you, the buyer, as the experience of tire users.

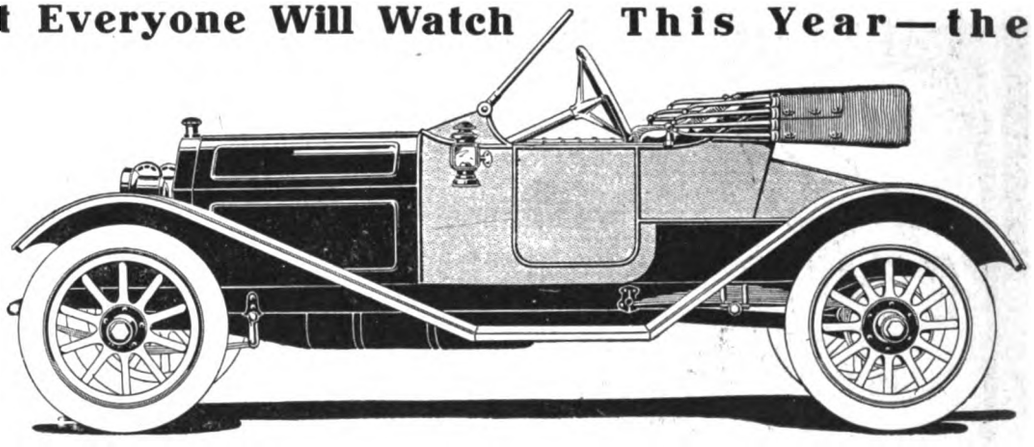
Our experience enables us to put into Kelly-Springfield Tires that quality which has given many a driver more mileage than he had a right to expect.

Kelly-Springfield Tire Company, 20 Vesey Street, New York

Here is the Car That Everyone Will Watch This Year—the

1913 King "36" Roadster

$1190 Fully Equipped



The Features That Have Made the King Famous are all included in this handsome, snappy roadster—the King extra long stroke motor—the one lever center control—the left hand steer—the King patent rear spring suspension.

The silent, responsive motor delivers a full 36 horsepower, giving the speed, the hill-climbing power, the quick "pick up," the flexible control that is found only in roadsters usually costing from five hundred to a thousand dollars more than this new King Model.

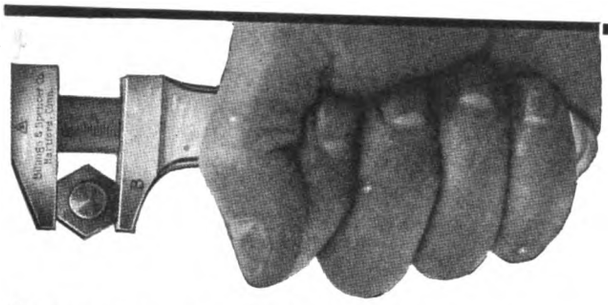
SPECIALLY DESIGNED THROUGHOUT—The King Roadster is not a roadster body on a touring car chassis, but has been especially designed throughout for speed, comfort, strength, light weight and tire economy. The engine is seated 8 inches back of the axle, giving perfect distribution of the load, and thorough "roadability."

The body is large and comfortable, and the entire lines and finish have that thoroughbred appearance that the man of distinction wants in his car.

The Roomy Rear Deck Compartment is a feature worthy of special mention. It houses from dust and weather one extra tire and two large suitcases, making it the ideal car for vacation outing and tours. You should have full details about this remarkable roadster at once. Prospective dealers will find it the best selection they can make, if they are looking for a distinctive car at an unusually attractive price. Let us hear from you promptly if you want to profit by the popularity this car will certainly enjoy.

KING MOTOR CAR COMPANY, 1314 Jefferson Avenue, Detroit, Michigan

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Wrenches That Grip and Stay Gripped

You will never know the annoyance of a wrench that slips if you use the triangle trade-marked brand—because B. & S. Wrenches, like all other

Billings & Spencer Tools

"The Tools That Are Guaranteed"

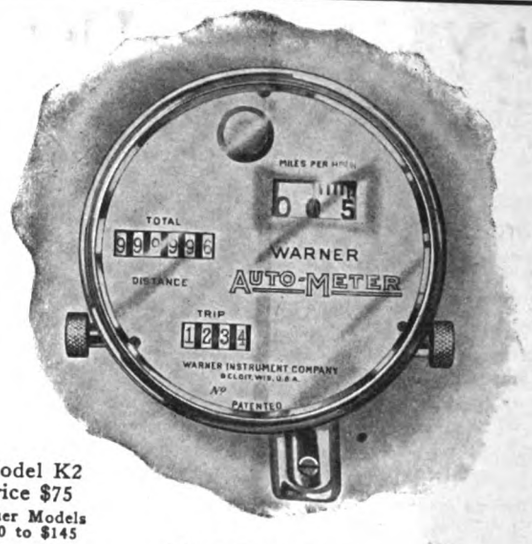
are drop-forged of high-grade steel, hardened in the right places against wear—annealed in the right places for tensile strength. They grip and stay gripped.

Whatever your tool requirements, your assurance of absolute satisfaction lies in the trade-mark which appears on every genuine Billings & Spencer Tool. Look for it.

On Sale Everywhere.

WRITE TODAY FOR NEW CATALOG

THE MARK OF QUALITY — B — THE BILLINGS & SPENCER CO. HARTFORD



Model K2
Price $75
Other Models
$50 to $145

WARNER AUTO-METER

"The Aristocrat of Speed Indicators"

CONSISTENT Auto Manufacturers are equipping with the Warner Autometer. How can a car be truthfully advertised as thoroughly good throughout when the speed indicator is known to be cheap and inferior?

WARNER INSTRUMENT CO., 1197 Wheeler Ave., Beloit, Wis.

Branches at

Atlanta	Chicago	Denver	Kansas City	Philadelphia	San Francisco
Boston	Cincinnati	Detroit	Los Angeles	Pittsburgh	Seattle
Buffalo	Cleveland	Indianapolis	New York	Portland, Ore.	St. Louis

Efficient-Reliable Steering Gears



DEPENDABILITY and Reliability are inseparable from Quality. In steering gears, Reliability is of vital importance. It is not a matter of money—it's a matter of safety.

Warner Steering Gears, Mr. Manufacturer, are your best pledge of Safety, which means a Big Asset in your business. You are justified in using them by our eight year old reputation for building the highest grade steering gears produced.

Besides, we give you prompt and dependable deliveries, service and satisfaction. Write.

We modify our designs to meet your detail requirements, or build to approved designs on seasons quantity specifications.

Detroit Office
628 Ford Building

Philadelphia Office
Glenwood Av. and 2nd St.

Warner Gear Co.
Muncie Indiana

The Hotel of Comfort

The WOODSTOCK

"You can walk from there to anywhere"

Our new addition is ready for occupancy.
We now have 360 rooms with 265 baths.
Write us for descriptive folder with typical floor plan and rate card.
Wire for reservation at our expense.

RATES

Court room with bath, for one, per day.....$2.50
Court room with bath, for two, per day..... 3.50
Outside room with bath for one, per day..... 3.00
Outside room with bath, for two, per day..... 4.00
Outside room with twin beds, for two, per day $4.00



HOTEL WOODSTOCK

127 W. 43d St.
New York

W. H. Valiquette, Manager.

Also
"THE BERWICK"
Rutland, Vermont

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WAYMAKER HORN

The best auto horn — *and the best advertised*

The Waymaker Horn has proved its case.

Dealers who handle it report exceptional sales—their repeat orders lead us to spread our advertising largely, starting with June.

Through *The Saturday Evening Post* alone, we are reaching two million circulation—or ten million readers, at the accepted average of 5 readers per copy.

Through *Cosmopolitan, Everybody's, McClure's, Review of Reviews, Collier's Weekly, Life, The Literary Digest, Hearst's Magazine, American Motorist, Motor Car, Motor, Motor Print, Auto Trade Journal, The Automobile and The Horseless Age*, we are reaching over three million, four hundred thousand additional circulation (or another 17 million readers, if you want complete figures).

Never before has an auto horn been so well advertised—reaching practically every car owner direct and through all his friends.

This means orders — for you

if you want them. Stock up at once on the **Waymaker Horn.** Write to-day for our trade proposition, our descriptive booklet V, and the **Waymaker Data Book,** showing how our simple coupling system enables you to fit any car from a minimum stock of coupling.

Lee Tire & Rubber Co. CONSHOHOCKEN, PA.
J. Ellwood Lee, President

Bosch Plugs

Famous Racers Use Them Exclusively

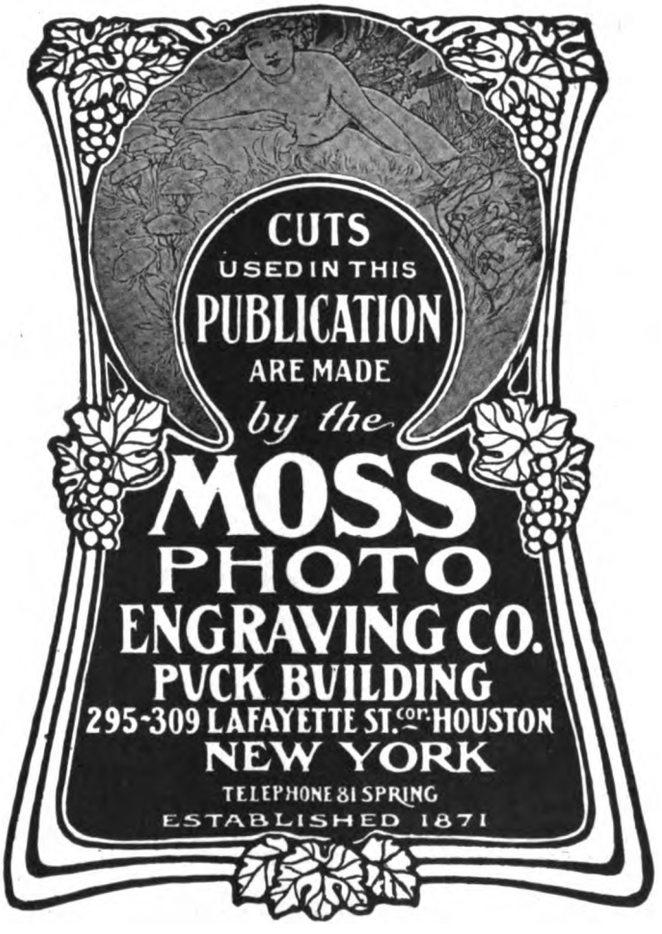
BOSCH Plugs need not be looked upon with an eye of suspicion, they are a dependable high-class product that will give satisfaction in any engine.

Not only the cheapest in the end, but the best money can buy, the best that experience knows, the best by actual trial.

Say Bosch to your dealer and be satisfied, always.

$1.00 Each

BOSCH MAGNETO COMPANY
223-225 West 46th Street New York



1,000 Island House

ALEXANDRIA BAY

Jefferson County New York

IN THE HEART OF THE THOUSAND ISLANDS

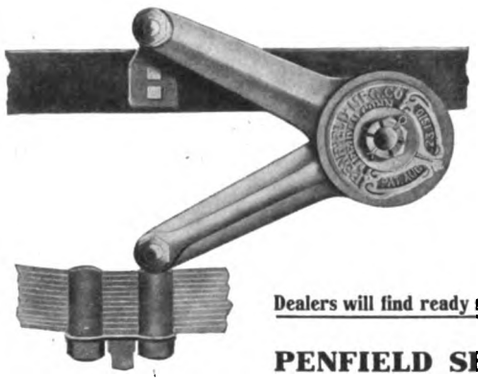
In the most enchanting spot in all America, where nature's charms are rarest, all the delights of modern civilization are added in the 1,000 Island House. No hotel of the Metropolis provides greater living facilities or such luxurious comfort—real **home** comfort—as does this palatial Summer retreat. An amusement for every hour, or quiet, complete rest, is the choice of every guest.

ALL DRINKING WATER USED IN THE HOUSE IS FILTERED

Send two 2-cent stamps for Illustrated Booklet.

O. G. STAPLES, Proprietor
HARRY PEARSON, Chief Clerk.

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The Penfield Shock Absorber

Compensating Spring, shown here as attached to car, operates through a triple circular coil, positively absorbs both shock and recoil—eases the springs under all conditions.

Saves riders, power plant, springs and tires, conducing comfort and preventing wear and tear.

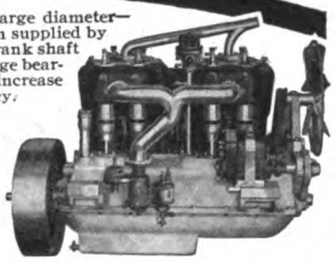
Cannot Break — Needs No Adjusting — Has Absolutely No Wear

Dealers will find ready sale for this shock absorber.

Standard for cars over 3000 lbs., per set of four, $50.00.
For cars less than 3000 lbs., per set of four, $45.00.

PENFIELD SHOCK ABSORBER MFG. CO., 51 Randolph Ave., Meriden, Conn.

Crank shaft is of large diameter—self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. Their extra large bearings reduce friction to a minimum—increase durability and efficiency.



Wisconsin

The Consistent Motors

ALL 4 CYCLE—5 TYPES

3 3-4 in. bore, 5 in. stroke, 4 cyl. 4 1-4 in. bore, 5 in. stroke, 4 cyl. 4 1-4 in. bore, 5 in. stroke, 8 cyl.
4 3-4 in. bore, 5 1-2 in. stroke, 4 cyl. 5 1-4 in. bore, 7 in. stroke, 4 cyl.

WISCONSIN MOTOR MANUFACTURING COMPANY
Dept. 32, Milwaukee

United States Tires



ARE GOOD TIRES

Drop Hammer Forgings

cost very little more than castings. They are vastly superior and less expensive in the end.

WE ARE SPECIALISTS

in producing

DROP HAMMER FORGINGS

from special analysis steel.

Send prints of parts you will need in

1913.

QUALITY AND SERVICE GUARANTEED

THE CONSOLIDATED MANUFACTURING COMPANY, Toledo, Ohio

Magneto Bargains

$30.00 for a **$105.00** **6** cylinder
$20.00 for a **$93.00** **4** cylinder
$18.00 for a **$65.00** **2** cylinder
$16.00 for a **$60.00** **1** cylinder

Imported U. & H. High Tension Magnetos Less Than Import Cost

Circular and Price Lists Free

J. S. BRETZ COMPANY, 250 W. 54th Street, New York

Price

$20

Without Cylinder Attachments

"The Crankless" STARTER

By adding an injector and cylinder attachments the crankless starter becomes absolutely perfect—100% efficient. For 4 cylinders the extra attachment costs $10, for 6 cylinders, $15.

Guaranteed by our 40 years standing and reputation.

COX BRASS MFG. CO. Established 1872 **Albany, New York**

SPLITDORF MAGNETO

"Always There"

SPLITDORF ELECTRICAL CO.
Walton Ave. and 138th St. NEW YORK

Chicago Boston Los Angeles
Detroit Kansas City San Francisco

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WINTON SIX

Our Banner Year

At the close of the best year in the long history of this company, we want every Winton Six buyer to know that we appreciate his patronage and that, as the years go on, we hope always to be deserving of his continued patronage.

THE WINTON MOTOR CAR CO.

426 Berea Road **Cleveland, O.**

Shall we put your name on the list for 1913 catalog, shortly to be issued?

Ford
THE UNIVERSAL CAR

Its lightest—rightest—most economical—that's the reason we'll make seventy-five thousand of them this year. Prices $590 to $900. Agencies everywhere.
Ford Motor Company Detroit, Mich.

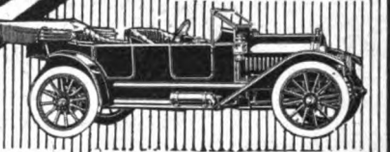
COVERT Transmissions



will help bring your car to the standard of efficiency that you are working for. Every gear shaft and bearing is made of nickel steel, heat treated and accurately ground. All material and workmanship is guaranteed. Will be glad to talk with you about them.

COVERT MOTOR VEHICLE CO.
Sales Office: Ford Building, Detroit, Mich.
Factory: Lockport, N. Y.

Jackson
No hill too steep
No sand too deep



MODEL 52 $1800.
" 45 $1650.
" 32 $1100.
" 26 $1100.
" 28 $1000.

JACKSON AUTOMOBILE CO.
1204 E. Main Street
JACKSON, MICHIGAN

Hupmobile

Long-Stroke "32" Touring Car
$900 F. O. B. Detroit

Motor 3¼ x 5½ inches; four cylinders; Bosch magneto; three speed sliding gears; tires 32 x 3½ inches; 106 inch wheelbase. Equipment includes windshield, gas headlights, generator, oil lamps, tools and tire repair kit.
Roadster body on same chassis and with same equipment, $900 F. O. B. Detroit.

Runabout—$750
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Equipment of top, windshield, gas lamps and generator, oil lamps, horn and tools.

20 H. P. Models

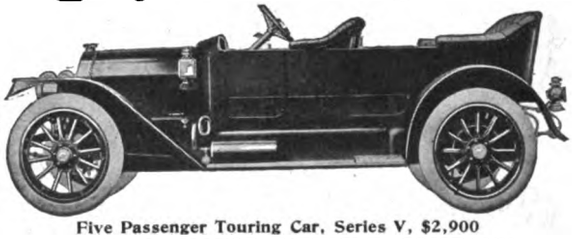
Roadster—$850
F. O. B. Detroit. Same chassis and power plant as World-Touring Car. Wheelbise, 110 inches. Same equipment as Runabout, also highly finished steel box on rear deck for tools and accessories.

Coupe—$1100
F. O. B. Detroit. Same power plant as World-Touring Car. Wheelbase, 86 inches. Electric headlights, electric and oil side and tail lamps, folding dash seat for third person. Rear tires, 31 x 3½ inches. With 110 inch wheelbase, $1150.

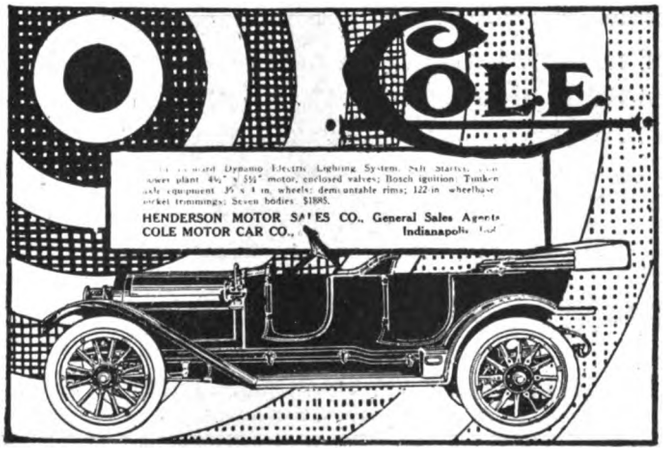
HUPP MOTOR CAR CO., 1254 Jefferson Ave., Detroit, Mich.

Stock Champion **International Champion**

National 40



Five Passenger Touring Car, Series V, $2,900
NATIONAL MOTOR VEHICLE COMPANY
1007 E. 22nd Street Indianapolis, Ind.



Pullman AUTOMOBILES

Pullman cars are not sold to dealers because of enormous dealers' commissions—but because Pullman dealers have no trouble in selling Pullman cars at list prices. The purchaser gets the greatest value possible for the money—the dealer gets a good, fair profit. Results—both customer and dealer satisfied.

Four different size motors—3 four cylinder, 1 six cylinder—with a variety of body styles. Self cranking, electric lighting device, full equipment.

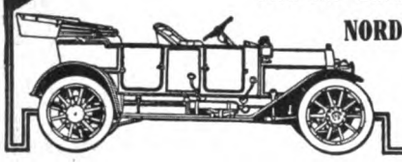
PULLMAN MOTOR CAR COMPANY
222 N. George Street YORK, PA.

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The Easiest Riding Car in the World

MARMON

A rational, logical car, made on one chassis —a body type for every requirement. Touring car, $2,750.
Ask for Catalog.



NORDYKE & MARMON CO.
(Established 1851)
Indianapolis, Indiana
Sixty Years of Successful Manufacturing

The *Pioneer* Moderate Priced Six-Cylinder Car

HAVERS - SIX - HAVERS MOTOR CAR CO.

Havers Self-Starting "Six-44"



Price $1850

SPECIFICATIONS TALK—Six-cylinder Motor, 4-cycle long-stroke type; 44 H. P.; Bosch Magneto; dual system; Model "C" Stromberg Carburetor.. 122-inch wheel-base; 36x4-inch wheels; self starter. Springs, semi-elliptic front, platform suspension, rear; rear axle, full floating type.

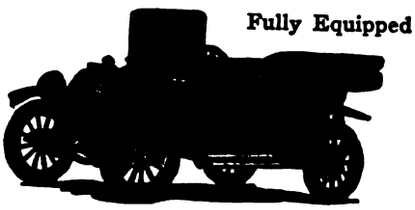
Full specifications sent on request,

HAVERS MOTOR CAR CO., 2775 28th St., Port Huron, Mich.

The Detroiter—$850

Fully Equipped

Five Passenger Touring Car



25 H. P. Long Stroke Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car. Write for specifications.

BRIGGS-DETROITER CO., 449 Holbrook Ave., Detroit, Mich.

Speedwell

A Car with those Qualities that really count

THE SPEEDWELL MOTOR CAR CO.
DAYTON, OHIO.

Touring Car
7-Passenger
$2,900
Fully Equipped including Self-Starter



cartercar

Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.

CARTERCAR COMPANY, Pontiac, Michigan

Mais Motor Trucks

Internal Gear – Not Chain—1½ and 2½ Tons

THE MAIS AGENT figures his profit when a truck is sold. It is not a modified pleasure car, but is built in factories for trucks only. Its maintenance expense is no more year after year than when first demonstrated. Its parts are interchangeable, you don't need a machine shop. All parts enclosed and lubricated.

It is a Certainty

Dealers Will Receive Personal Attention

MAIS MOTOR TRUCK CO., Indianapolis, Ind.

Stearns

THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler Mercedes, Panhard and Minerva

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches: New York, Pittsburg, Atlanta, Minneapolis and San Francisco

A prudent buyer in selecting an automobile of permanent utility seeks the security of an established guarantee.

4 and 6 Cylinder Motors
2, 4, 5 and 7 Passenger Cars

KLINE KAR

4 Speeds Forward
Self-Starting
Detachable Rims

One Quality in All Models

4-30 $1700 $1750 | 4-40 $2200 $2250 | 6-50 $2800 $2800 | 6-60 $3300 $3300

Agents wanted in open territory. Write today.

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Factories: York, Pa., Richmond, Va.

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Start Your Car 25 Times for a Cent

INVINCIBLE STARTER

will start any four-cycle engine of four or six cylinders. Turn on the switch—that's all.

Price, NOW, Only $10

Fully guaranteed. Money back if not satisfied. Send your order today, stating make and model of your car. Illustrated Catalog Free.

INVINCIBLE STARTER CO., 748 Penobscot Bldg., Detroit, Mich.



Volkmar Auto Starter

Safe **Efficient**

Convenient **Economical**

A SPRING starter of Simple Perfection, ABSOLUTELY AUTOMATIC action and FULLY GUARANTEED.

Live Agents Wanted.

VOLKMAR AUTO STARTER COMPANY

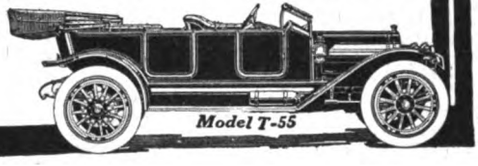
164 Fulton Street **New York, N. Y.**

THIS Cutting CAR

Has more Horsepower and a longer Wheel Base than any other Four Cylinder Automobile in the World selling for this price $1850

Send for our Chart of Comparative Motor Car Values

Clarke-Carter Automobile Company Jackson, Mich.



Model T-55

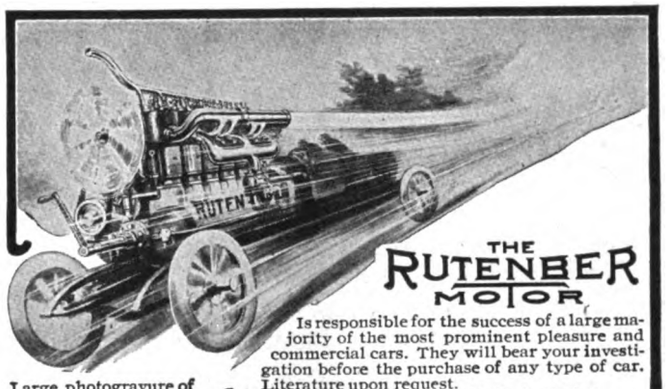
Champion Spark Plugs

Special Designs for Every Type of Motor Made

CATALOG MAILED ON REQUEST

Champion Spark Plug Co.

TOLEDO, OHIO



THE RUTENBER MOTOR

Is responsible for the success of a large majority of the most prominent pleasure and commercial cars. They will bear your investigation before the purchase of any type of car. Literature upon request.

THE WESTERN MOTOR CO., Marion, Indiana

Large photogravure of the above cut for framing 14c in stamps.

If You Need Motor Lamps

You Need This Catalog

We want you to write for the Solar Catalog before you decide on your motor lamps, for this is the most complete line of lamps on the market. Solar Lamps have been preferred by most motorists for the past fourteen years because of their brilliancy, their style, their strength and their several exclusive advantages —their special short focus lead glass lens mirror reflectors—the patented double ray light projection (in the Solarclipse), giving two distinct fields of light, for city and country use—the new black finish, the only such finish that's proof against heat and moisture—and other features that other lamps lack.

To fail to see Solars before you buy is to fail to include in your consideration the very finest lamps in existence. Solars are made for oil, electricity, gas and in combination, for pleasure cars, motor trucks, carriages, motor boats and airships. Write for catalog now—while you think of it. (136)

Kenosha, Wis. **BADGER BRASS MFG. CO.** **New York City**

SOLAR LAMPS

"AC"

This name stands for efficiency in

SPARK PLUGS

Used as standard equipment by seventy-four prominent manufacturers.

CHAMPION IGNITION COMPANY. Flint. Mich.

AUTOMOBILE OWNERS AND TOURISTS

should break their journey and avail themselves of the excellent facilities afforded by the D. & C. Lake Lines, operating daily service between Detroit and Buffalo and Detroit and Cleveland.

Enjay the delights of the cool breezes from Lake Erie and resume your journey in the morning after a refreshing night's rest. Special attention given by this Company to the handling of automobiles. Rates quoted on application (state wheel base); Tanks of Automobiles must be emptied of gasoline before being shipped; three gallons of gasoline supplied free on arrival at destination.

Roads in this section of the country are in first class condition; new road now under construction between Detroit and Toledo. Tourists speak highly of the route between Buffalo and New York.

On your trip this summer bear in mind "The Waterway is The Only Way."

DETROIT & CLEVELAND NAVIGATION CO.,
General Offices, Detroit.

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Empire Tires
WEAR LONGEST
EMPIRE TIRE CO., Trenton, N.J.

K·D
The Motor With the Sliding Crescent Valve
KNIGHT-DAVIDSON
1896 — 1912

The CRESCENT valve of the K-D Motor, fitting around the stationary piston wall affords a larger port area than any other poppet or slide valve on the market. It is simpler and, consequently, better than any other valve construction known and is here offered to discriminating manufacturers, not as an experiment, but as a tried, tested and proved mechanical advance. The K-D motor is simple, silent, cools rapidly, has the simplest oiling system known, will not carbonize. Last and most important, will give on a given quantity of fuel more power, speed and endurance, unit for unit, than any other engine on any type of an automobile. We want to present some facts to interested manufacturers.

KNIGHT-DAVIDSON COMPANY, Boston, Mass.

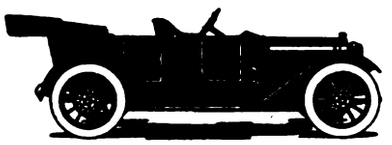
KNIGHT-DAVIDSON

THE CENTURY
A Car Embodying Advanced Ideas in Electric Construction

Of proper design, more room, more luxuriously furnished, graceful constructive lines, unit power plant. Motor has overload capacity of more than 300%. Two-passenger Century Roadster; five-passenger Century Brougham. In finish, lines and equipment either is ahead of the highest price cars money can buy. Get our proposition NOW.

CENTURY ELECTRIC MOTOR CAR CO.
1199 Woodward Avenue, Detroit, Mich.

Mighty Michigan Forty



40-Horsepower Touring Car or Roadster, absolutely silent in operation. Cylinders 4¼ x 5¼-in. — 116-in. wheelbase—34 x 4-in. tires—demountable rims—nickel mountings—massive, straight line body—big, roomy seats—proved self-starter—everything. Price $1500. Guaranteed for life by the Michigan Buggy Company. 40-horsepower Roadster on the same chassis. Two smaller models. Catalog on request. (83)

MICHIGAN BUGGY COMPANY, 188 Lay Blvd., Kalamazoo, Mich.

The Kinsey Manufacturing Company
TOLEDO, OHIO

Manufacturers of Auto Parts,
Kinwood Radiators, Fenders,
Kinwood Oilers, Gaskets,
Kinwood Steel Frames, Etc.

SPECIAL METAL STAMPINGS

B & L CASTER FRONT AXLE
Makes a Big Winner in Philadelphia
Our Philadelphia Agent writes it is a Great Success.

A. S. BURNELL, President and General Manager, 1346 Michigan Avenue, Chicago, Ill.

Philadelphia, Pa., February 28, 1912.

Dear Sirs:—The axle is a great success, is running fine. Have made several demonstrations and every one says it's the only front axle that ought to be allowed to go on the automobile, for safety, easy steering and perfect control. Will sell the majority of those I have demonstrated for. Enclosed you will find order for one axle to go on a Studebaker car, 1908 model, more orders will follow later. Send us a big cut for we are going to run a one-half page in our newspaper, we will advertise it right. We will equip at least one thousand cars this year. Our new garage will be at 1907 after March 12th, N. 23rd St. Circulars received all O. K., thanks for same. Rush the order for axle, as every one on a car will sell several more. Yours very truly,

H. SCHROEDER,
President and General Manager Lake Schroeder Auto Exchange.

Philadelphia, Pa., 1418 Blavis St.

AGENTS WANTED for all cities in the United States to put the B & L Caster Front Axle on old cars. Exclusive territory given to good men. Our axle when on a car proves that it is the only safe axle made. In buying a new car demand that it be equipped with the B & L Caster Axle. Write for Agency Proposition. Address:

A. S. BURNELL, Manager Chicago Branch, 1346 Michigan Avenue.

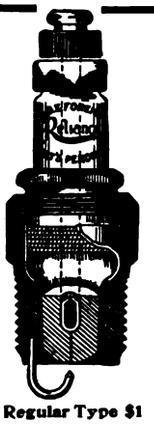
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TRUCK FRAMES

Automobile Frames and Special Stampings

THE PARISH & BINGHAM CO.

CLEVELAND, OHIO



Unless your spark plugs resist soot and carbon, they are not up to the

Reliance

standard of efficiency.

Ninety per cent. of all engine troubles can be traced to the ignition system—a better understanding of this system helps.

Our free book, "Ignition and Spark Plug Talk," explains everything. Mailed you on request.

JEFFERY-DEWITT CO.

65 Butler Avenue Detroit, Mich.

Regular Type $1

Largest Spark Plug Manufacturers in the World

Diamond Tires

We could build them cheaper
But We Won't.
We would build them better
But We Can't.

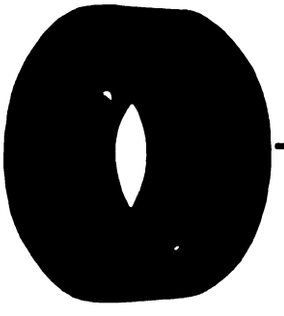
THE DIAMOND RUBBER CO.
AKRON, OHIO



Patent "Luxury" Folding Seats

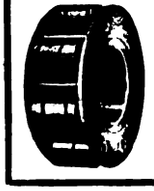
Do you wish to make your car more comfortable by installing a pair of auxiliary seats? If so, have the best. Our seats are made in five styles. Send for catalogue.

HODGE & GRAVES CO.,
Amesbury, Mass.



Eliminate Noise in Your Car

Use Hyatt Roller Bearings

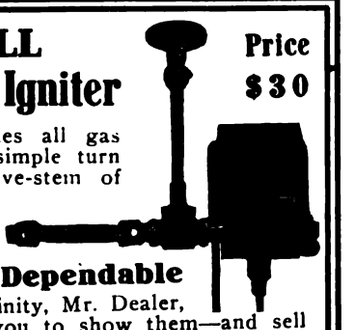




Hyatt Roller Bearing Co.
Detroit, Michigan

THE GRINNELL
Gas Controller and Igniter

Price **$30**



Lights, dims and extinguishes all gas lamps on the car through a simple turn of the hand. Coupled to valve-stem of acetylene tank. Direct control. Always within easy reach.

Convenient — Safe — Dependable

Every car owner in your vicinity, Mr. Dealer, will be interested—it's up to you to show them—and sell them. Write for booklet and dealer discounts.

THE G. C. A. MANUFACTURING CO., Pittsfield, Mass.
Sole Licensed Manufacturers for the United States

Best on Earth — Kantsamore

ESTABLISHED 1855

Phineas Jones & Company
305-313 Market Street, Newark, N. J.
Branch Factory: 12th Avenue and 55th Street, New York City

Automobile Wheels
For Pleasure Cars and Trucks

Repairing and truing old wheels a specialty. Experimental wheels a specialty. We furnish and apply any style demountable or detachable rim or tire.

PRESSED STEEL

FRAMES

A. O. SMITH COMPANY
MILWAUKEE

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FIAT

"THE MASTER CAR" FIFTEENTH YEAR

4 Cylinder 35 H. P. $4500; 6 Cylinder 50 H. P. $5500
(Completely Equipped)

The Fiat Agency Policy Is One of Permanency

POUGHKEEPSIE F.I.A.T. NEW YORK

The Electric Car of Quality

THE COLONIAL

Big, roomy, 5-passenger, open or enclosed car of distinctive design and luxurious appointments. Equipped with self-starting device. It's the car with a thousand little conveniences—

and the price is $2700

DEALERS—Wire now for territory which is choice but going fast.

COLONIAL ELECTRIC CAR COMPANY
Detroit, Michigan

NEW YORK · PENNSYLVANIA · MASSACHUSETTS · WASHINGTON · DELAWARE · COLORADO · WISCONSIN · OREGON · MINNESOTA · RHODE ISLAND · OHIO · KANSAS · DAKOTA · ALABAMA · NEBRASKA · IDAHO · VERMONT

The Only Complete Car

Electrically Self Started and Lighted

Inter-State

Six Models 40 & 50 H.P. Fully Equipped

Model 40—5 Passenger, Fore Door Touring Car.
Model 41—4 Passenger Demi Tonneau.
Model 42—Roadster type—all with the splendid new en bloc motor, 4½ in. bore 5½ in. stroke. 40 H. P. $2400

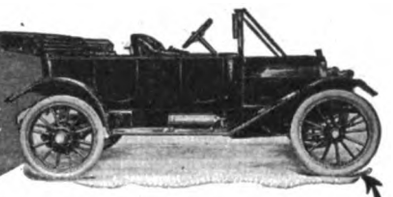
Model 50—7 Passenger, Fore Door Touring Car.
Model 51—4 Passenger Demi Tonneau.
Model 52—Roadster type—all with the new "T" head 5 in. bore, 6 in. stroke motor. 50 H. P. $3400

Model 30-A—Fore-Door, a 40 H. P., 5 Passenger Touring Car at $1750
Model 32-B—A 40 H. P. Roadster at - - - - - $1700

All fully described in our Art Catalog. Send for one today.

Inter-State Automobile Co., Dept. O Muncie, Ind.
Boston Branch: 153 Massachusetts Ave. Omaha Branch: 310 S. 18th St.

The Car THAT HOLDS THE CONFIDENCE OF ALL Glide



36-42 H. P.
Complete Equipment
$1550.00

From the standpoint of actual service, utility and equipment, the "Glide" has won the confidence of all. First, the dealer handling the "Glide" has a car that he can sell with the assurance that it will satisfy the purchaser; second, the buyer actually gets more real automobile worth and efficiency out of the "Glide" than he can obtain from cars costing nearly twice the price. Send for handsome book and learn why the "Glide" is best. 5 to 7 years actual service is one reason—but there are many others.

Dealers—select territory still open. Write us.

THE BARTHOLOMEW COMPANY, 220 GLIDE STREET, PEORIA, ILLINOIS.

Empire Twenty-Five

The Little Aristocrat

This is the Big Brother of the Famous Empire Roadster and is a small edition of $5,000.00 cars.

Hence the price of $850 puts this car in a class by itself. Specifications prove the Empire 25 to be the most "Aristocratic" little touring car in America. Write for details today.

THE EMPIRE AUTOMOBILE CO.
224 Massachusetts Street Indianapolis, U. S. A.

Motor Car Manufacturers Since

1893

HAYNES

1912

Occupying the newest and most modern automobile manufacturing plant in America.

HAYNES AUTOMOBILE COMPANY, Dept. T-8 Kokomo, Ind.

Abbott-Detroit 1912 MODELS

MODEL "44"

Seven Passenger, Fore-door Touring Car, fully equipped, less top, windshield and extra seats	$1800
Fore-door Demi-Tonneau, fully equipped, less top and windshield	1775
Fore-door Limousine, fully equipped	3000

MODEL "30"

Fore-door Touring Car, fully equipped, less top and windshield	$1350
Fore-door Roadster, fully equipped, less top and windshield	1275
Colonial Coupe, fully equipped	2150

ABBOTT MOTOR COMPANY
607 Waterloo Street Detroit, Michigan

SHAWMUT TIRES

SOLD EVERYWHERE SHAWMUT TIRE CO., Boston, Mass.

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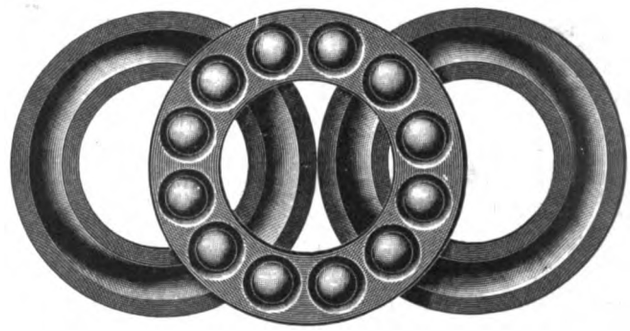
No Cranking! No Pumping!

START YOUR CAR FROM THE SEAT
ALWAYS READY AND POSITIVE

The AMERICAN STARTER is the Only Starter on the market that measures the amount of gas injected into the cylinders. You cannot "dope" the engine with the AMERICAN STARTER.

American Starter and Carburetor Mfg. Co.
2022 S. 40th Avenue CHICAGO, ILL.

WE MAKE THE BEST



BANTAM ANTI-FRICTION CO., Bantam, Conn.

You Need Speedo

IT'S GUARANTEED

Price $3.50 With Decarbonizer High Power Models Upward

It will save you 20 per cent. in gasoline, increase power of motor 20 per cent. and is a positive preventive of carbonization.

How It Works—SPEEDO breaks up, under spray, each particle of gas after leaving carburetor, injecting additional air, automatically. Makes easy cold weather starting and is sold only Under Guarantee of Absolute Satisfaction. Ask your dealer.

INTERNATIONAL ACCESSORIES CORPORATION
Chicago Branch, FULTON-GRUBB CO., 1180 Michigan Blvd.

Better Than Commercially Perfect GEARS

Bevel Differential
Transmission
Steering

$3,000,000 in plants affording the most superior facilities for fine work; also hardening and treating of the finished product. Most thorough inspection and testing system. Our own laboratory.

Brown-Lipe-Chapin Gear Company
H. W. CHAPIN, Gen'l Mgr. SYRACUSE, N. Y.

Bower Roller Bearing Co.

DETROIT, MICH.

Manufacturers of High Grade
ROLLER BEARINGS
For All Purposes



Our Consulting Engineering Department is always at your service.

Send for catalog, price-list and specification sheets of sizes.

The unparalleled success of

NEWTONE Motor Horns

has been most gratifying



Torpedo Type

Put a "Newtone" on your car

Price $20

Automobile Supply Mfg. Co.
220 Tuttle Place, BROOKLYN, N. Y.

Cored Bars for Bushings



All sizes from 1 inch to 3 1-4 inches diameter cored and solid bars kept in stock for immediate shipment. Order by wire. We will ship by express.

Specify PARSONS' WHITE BRASS for main and crank pin bearings. CRAMP'S SPECIAL BEARING BRONZE for wrist pin bearings.

The Wm. Cramp & Sons Ship and Engine Building Company
PHILADELPHIA, PA.

MARK YOUR TOOLS



AND AVOID THEFT

Take advantage of this special offer, which lasts for 30 days: Upon receipt of cash with order we will make your stamp for 10 cents per letter. Send us your order now.

THE SACKMANN MFG. COMPANY
88-90 Canal Street AKRON, OHIO

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The New Type of Electric

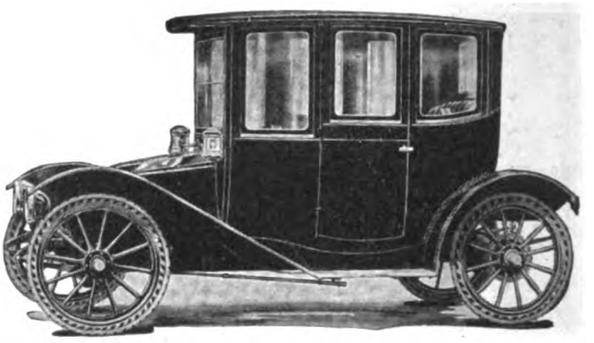
The Argo is setting new standards for builders of electric motor cars. Long and sweeping in lines—beautiful in finish—with luxury apparent in every detail, it attracts instant attention wherever it goes.

The Argo is different from the old style models—the body is not perched upon the chassis—it it swung low between the axles, with only 5 inches from curb to step. This low-hung construction gives not only the fine French lines, but low center of gravity. Swaying is impossible—skidding is reduced to a minimum—it is a radical departure from the old type of top-heavy, awkward, electric car.

ARGO ELECTRICS

The wheel steer of the Argo is handier—the only safe and sure steering method for rough and slippery roads—the silent, chainless, geared drive is more efficient—the long wheel base, large wheels and improved springs makes it ride easier than any other electric built.

AGENTS AND DEALERS—The Argo Electric Wagon is another good business proposition. Ask us about both



ARGO ELECTRIC VEHICLE CO.

1201 S. Jefferson Avenue SAGINAW, MICH.

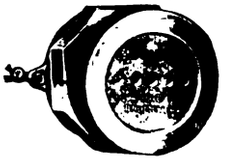
Chicago Salesrooms—2412 Michigan Avenue

JONES HUB ODOMETER

Registers mileage. Attached to hub. Sealed so that it cannot be tampered with or disconnected without owner's knowledge. Mileage quickly ascertained—always visible.

THE JONES SPEEDOMETER Factory: New Rochelle, N. Y.

Chicago, 1430 Michigan Avenue
Boston, 109 Massachusetts Avenue
Philadelphia, 1416 Vine Street
San Francisco, 544 Van Ness Avenue
Buffalo, 852 Main Street
Los Angeles, 1229 S. Olive Street
Portland, 329 Ankeny Street
Seattle, 917 East Pike Street
Detroit, 253-5 Jefferson Ave.



Any Kind Every Kind Stock, or to Blue Print **Rims** Clincher Q. D. Demountable Channels

For Automobiles, Motor Trucks, Aeroplanes, Motorcycles, Bicycles.

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.

R. B. ABBOTT SALES CO., Sales Agents, Detroit



"Firestone" Tires and Rims

are the least likely to require changing, and afford the best means of tire changing when required.



The Firestone Tire & Rubber Co., Akron, Ohio

and All Principal Cities

Standard Universal Rims



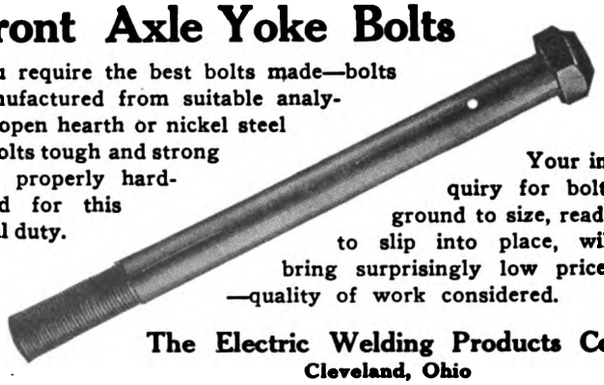
fit any style or make of tires. The side rings are reversible, they curve outward on one side to fit a straight side tire, inward on the other to accommodate a clincher. Two turns of a nut unlocks the rim for demounting, two more turns locks the rim in place. Write for catalog 607, which explains fully.



THE UNITED RIM COMPANY, Akron, Ohio

Front Axle Yoke Bolts

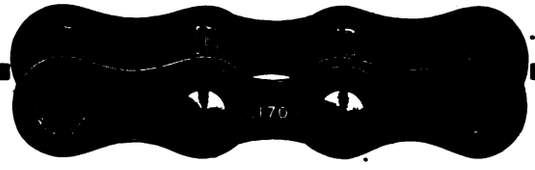
You require the best bolts made—bolts manufactured from suitable analysis open hearth or nickel steel bolts—bolts tough and strong and properly hardened for this vital duty.



Your inquiry for bolts ground to size, ready to slip into place, will bring surprisingly low prices—quality of work considered.

The Electric Welding Products Co.

Cleveland, Ohio



DIAMOND CHAINS

are and have been the recognized quality standard for 20 years. Strong, accurate and durable. Let us cut your sprockets.

DIAMOND CHAIN & MFG. CO.

150 W. Georgia St. Indianapolis, Ind.

Capacity 6,000,000 feet per year.

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NUMBER 4 *of a series of advertisements dealing with the bulb-horn as a warning device. These include opinions of prominent motorists, non-motorists, accident claim adjusters, traffic experts, mechanical engineers.*

THE LEGAL AUTHORITY

NEW YORK

Melvin T. Bender, Counsel for the Associated Automobile Clubs of New York State:

"I believe that the bulb-horn is coming to be generally recognized as a grossly inadequate warning device, and that the time is not far distant when the general public will take steps to insist—through legislation—that motorists carry a more efficient signal.

"In an emergency the bulb-horn is practically useless. Frequently it fails to operate, and often times, even when it is sounded, its note is so feeble as to be heard only a few feet in advance of the car."

MASSACHUSETTS

William A. Thibodeau, General Counsel, Automobile Legal Association of Massachusetts:

"The bulb-horn is the cause of an untold number of injuries and other accidents.

"The day it is cast aside will be a red letter occasion for the motorist and for the public."

ILLINOIS

Sidney S. Gorham, General Counsel for Illinois State Automobile Association:

"That the bulb-horn is both undependable and so feeble in sound that the rattle of surrounding traffic frequently makes it impossible to be heard, is a matter of common knowledge.

"The automobile signal has a serious mission, and I believe it unwise to use as a warning signal any device which lacks harshness and the abrupt note that is immediately recognized as a warning of danger."

MINNESOTA

James H. Hickey, Chairman Legislative Committee, Automobile Club of St. Paul, Minn.:

"The electric horn is the only adequate warning signal. Most motorists have the bulb-horn on the car simply because it is placed there by the manufacturer of the car, not because they have use for it."

WISCONSIN

James H. Drought, General Counsel for Wisconsin State Automobile Association:

"I believe that future legislation will require the uniform use of an absolutely adequate warning signal. With the din and noise of trolley cars and heavy traffic over the pavements of city streets, and likewise in the case of the rumble of the farmer's empty wagon on the rural highway, many so-called warning signal devices are utterly inadequate, because their sound is entirely drowned by these other noises.

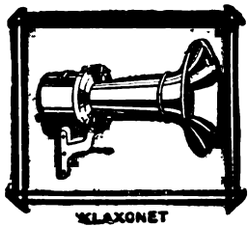
"I believe in the adoption of a warning signal with a harsh note as the best preventive of accident."

MARYLAND

Osborne I. Yellott, General Counsel for Automobile Club of Maryland:

"The bulb-horn has been tried and found wanting in Maryland. The accident record gives the reason why."

The bulb-horn has two elements in its favor: it is *cheap;* its use as a regular equipment of motor cars is *customary.* Otherwise it is universally recognized as without merit. How much longer can it remain the sole warning equipment of the majority of motor cars?



KLAXONET

LOVELL-McCONNELL MFG. CO., Newark, N. J.

KLAXON

The Public Safety Signal



KLAXON

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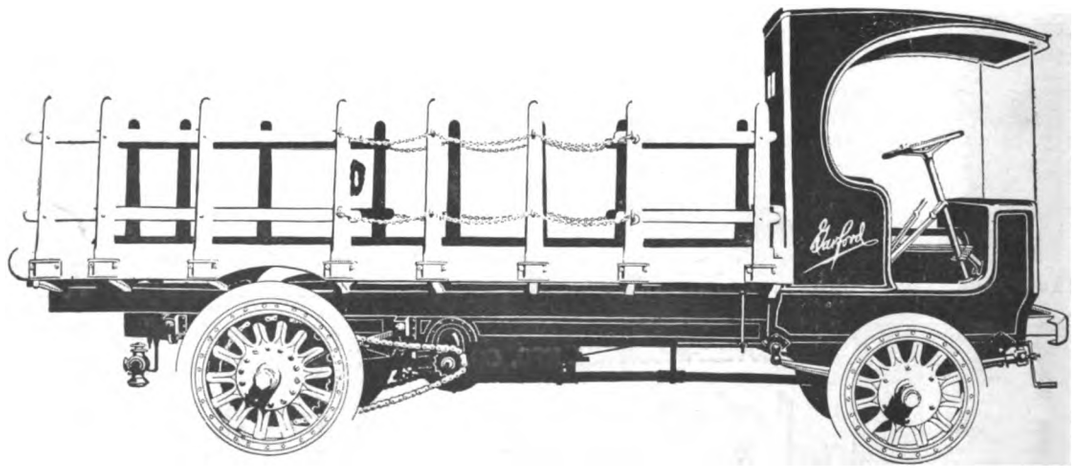
Garford

THE commercial motor car forms an important part of our 20th Century efficiency in business. The right truck is a positive economy, but the wrong one is a deadly expense. One saves, where the other wastes your money.

¶ For a good many years the Garford Company have been solving difficult transportation problems among all classes of important American concerns. This vast and varied experience has built the Garford Truck—the most practical truck in America. To any concern, who has merchandise to be handled, we can give some valuable information, by demonstrating the most economical system of delivery operations. It will be worth your while to investigate.

¶ Write at once for agency particulars and specifications of the full line. Ask for book D.

The Willys-Garford Sales Company, Toledo, Ohio



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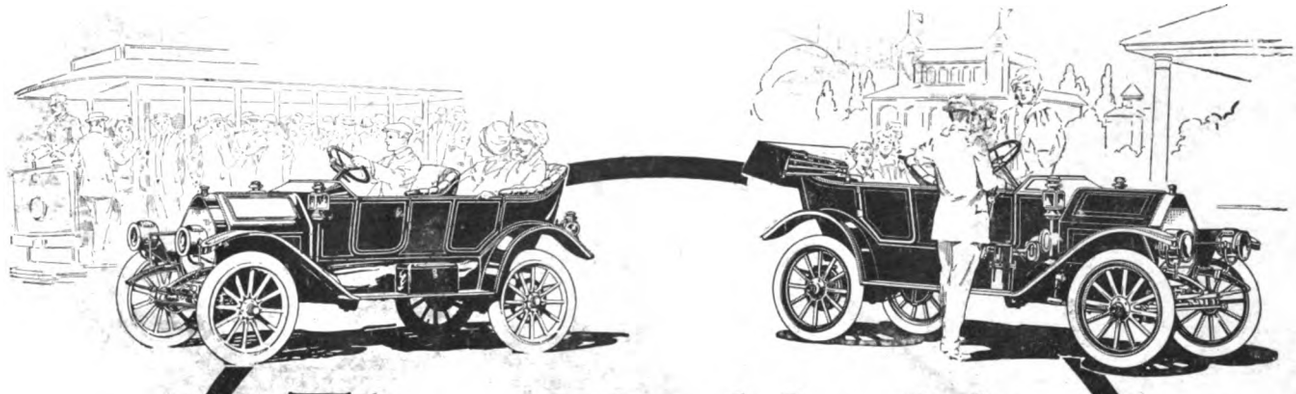
THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 2

New York, April 4, 1912

Ten cents a copy
Two dollars a year



The one big hit

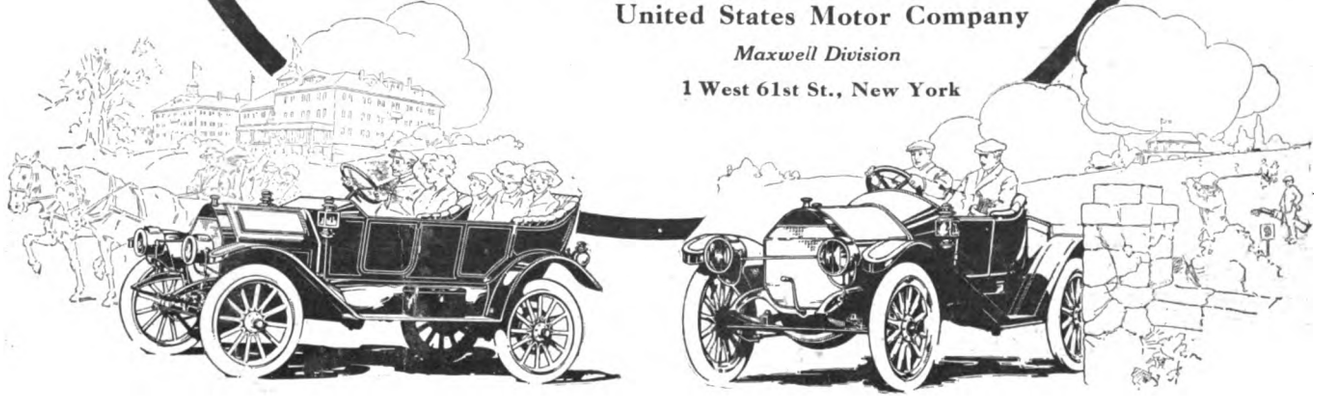
at all the automobile shows in New York, Chicago, Philadelphia and other cities—the one car that stood head and shoulders above all the rest—was the

Maxwell "Mascotte"

Touring Car $980, Roadster $950, *f.o.b. factory* *(top extra)*

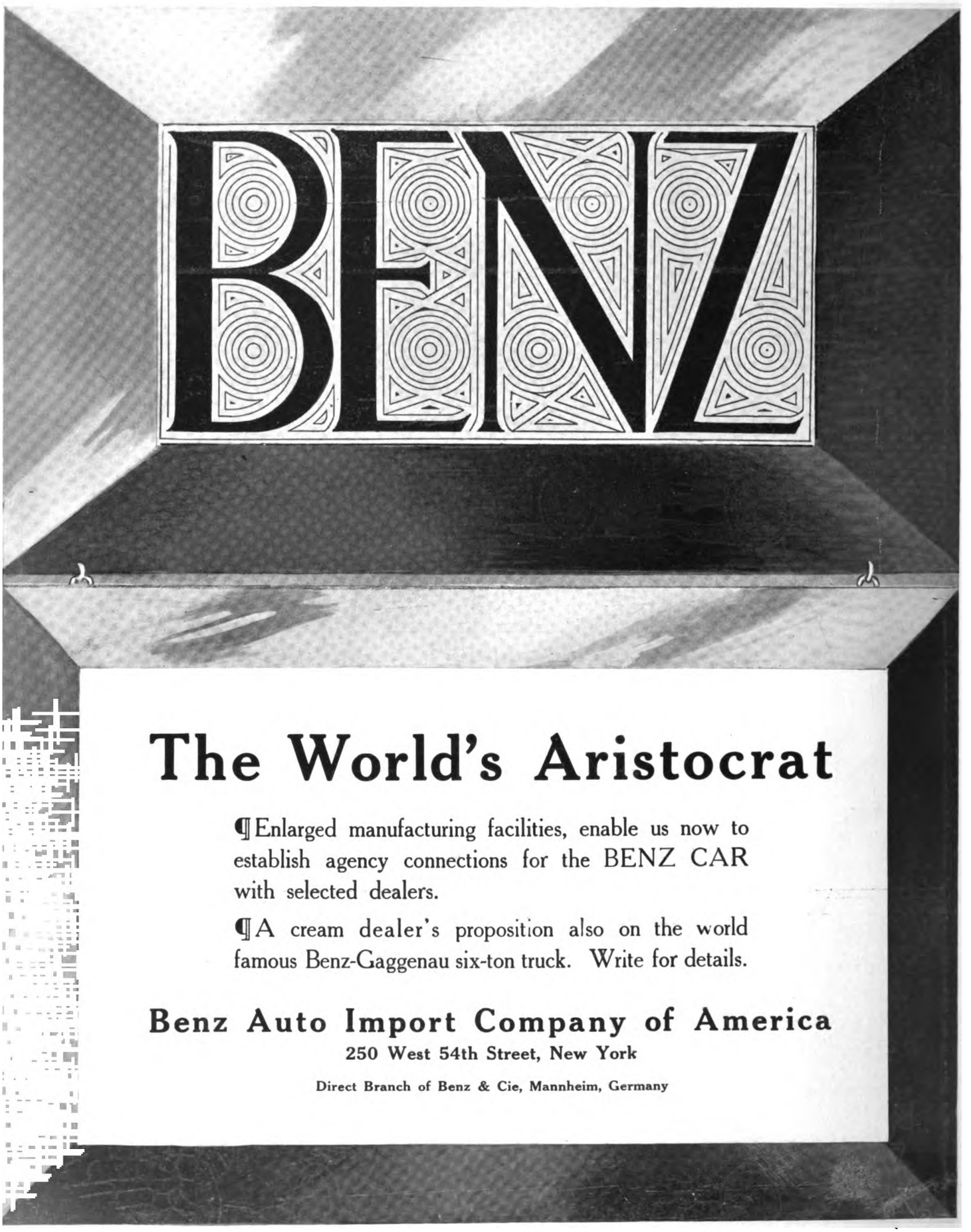
Send for a copy of the 1912 Catalogue de Luxe.
Just say on postal: **"Send Books."**

United States Motor Company
Maxwell Division
1 West 61st St., New York



Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York

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The World's Aristocrat

¶ Enlarged manufacturing facilities, enable us now to establish agency connections for the BENZ CAR with selected dealers.

¶ A cream dealer's proposition also on the world famous Benz-Gaggenau six-ton truck. Write for details.

Benz Auto Import Company of America

250 West 54th Street, New York

Direct Branch of Benz & Cie, Mannheim, Germany

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APR 13 1912

THE MOTOR WORLD

A Trade Paper Giving the World's Motor New

Vol. XXXI
No. 3

New York, April 11, 1912

Ten cents a cop
Two dollars a yea

Motor Lamps That Look Well Light Well and Last Well

YOU can't go wrong when you grace your car with Solar Lamps.



Torpedo Type

These lamps light your way. They are more brilliant than any other motor lamps yet made. And with this brilliancy goes efficiency and elegance that have put more Solars on high grade cars than can be claimed by all other lamp makes combined.

Solar Quality is born from over 14 years' experience in the perfection of high grade lamps. It stands for the finest of materials, the most advanced construction and the embodiment of several advantageous features found in no other motor lamps. Maximum service and minimum cost figured in terms of care and cash is one result. Lasting satisfaction is another.

Solars are made to meet all requirements of all kinds of motor driven vehicles. They are built for gas, electricity or both combined.

The catalog will describe the lamp you need. Write for it today.

THE BADGER BRASS MANUFACTURING COMPANY

Kenosha, Wisconsin **New York City**

Solar Lamps

Published Weekly by The Motor World Publishing Company, 1600 Broadway, New Yor

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MICHELIN UNIVERSAL REPAIR KIT



CODE WORD—*TABLE*

A Complete repair kit. Includes every requisite for making quick and permanent repairs to envelopes and inner tubes. Every article of standard Michelin quality.

Each kit includes a full size can of Michelin Mastic; a 2-oz. can of Michelin Cement; an assortment of Michelin Pure Para Red Inner Tube Patches; a Michelin Inside Envelope Blow-Out Patch, and other needful accessories.

A Comprehensive 32-page instruction book with every kit. All articles contained in a substantial metal box.

MICHELIN—MILLTOWN—N.J.

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THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 4

New York, April 18, 1912

Ten cents a copy
Two dollars a year

1913 PEERLESS CARS

Are Equipped With

GRAY & DAVIS

Lighting Dynamo System and Electric Lamps

¶ Last year's PEERLESS Cars also carried GRAY & DAVIS Dynamo and Electric Lamps. The PEERLESS engineers selected this equipment in preference to any other because every known road and laboratory test had proven it to be absolutely efficient and reliable—the best electric system in the world.

¶ After a year's service on all PEERLESS Cars, under every conceivable condition, these engineers have **again** selected GRAY & DAVIS Dynamo and Electric Lamps for 1913 equipment which

proves beyond question

that this system stands today—pre-eminent among lighting systems of Europe and America.

¶ You also want the proven best—the GRAY & DAVIS Dynamo. Do not accept a transformed train-lighting system or a mere "battery charger" for your car. Demand and insist upon GRAY & DAVIS equipment.

What the Peerless Company says:

"A factor in the unapproached completeness of Peerless Motor Cars is the Dynamo Electric Lighting System. It is installed on every car as a part of the standard equipment."

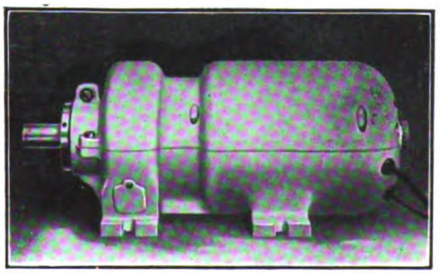
Write for Catalog

GRAY & DAVIS, Inc.

Manufacturers of Automobile Lamps

55 Lansdowne Street

BOSTON, MASS.



Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York

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The Car De Luxe

Agency connections now possible with representative dealers.

Also open for selected agents to handle

BENZ - GAGGENAU TRUCK

(Six Ton)

Details upon request.

Benz Auto Import Company of America

250 West 54th Street, New York

Direct Branch of Benz & Cie., Mannheim, Germany

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APR 26 1912

THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 5

New York, April 25, 1912

Ten cents a copy
Two dollars a year

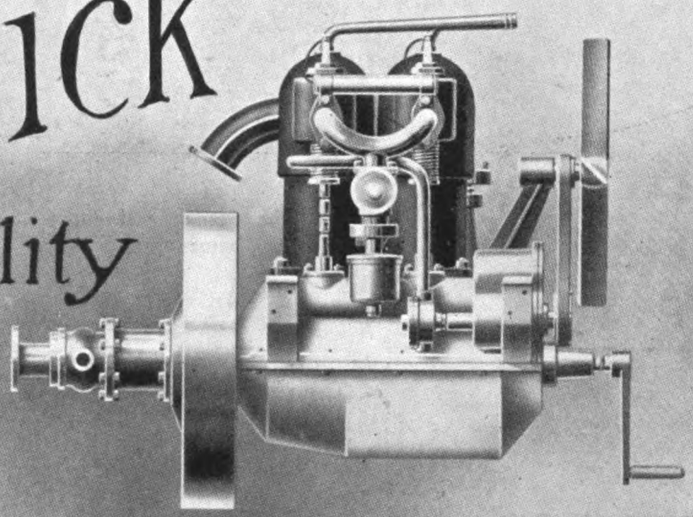
THE
PIERCE-
ARROW
TOURING CAR

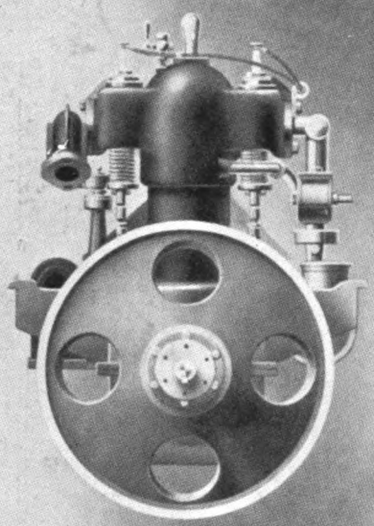
THE MOST NOTICEABLE IMPROVEMENT IN THE PIERCE-ARROW CAR THIS YEAR IS A REFINEMENT AND HARMONY OF LINE. WITH THESE DESIGNS THE BODY OF THE PIERCE-ARROW CAR SHAKES OFF THE INFLUENCE OF THE COACH BODY AND COMES FORTH AS THE FINAL EXPRESSION OF THE MOST SATISFACTORY AND ATTRACTIVE DESIGN FOR A MOTOR CAR.

THE PIERCE-ARROW MOTOR CAR Co., BUFFALO

Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York

Jencick Quality





POUND for pound, the commercial truck engine must possess greater endurance than the pleasure car motor. This is the policy back of Jencick design and construction.

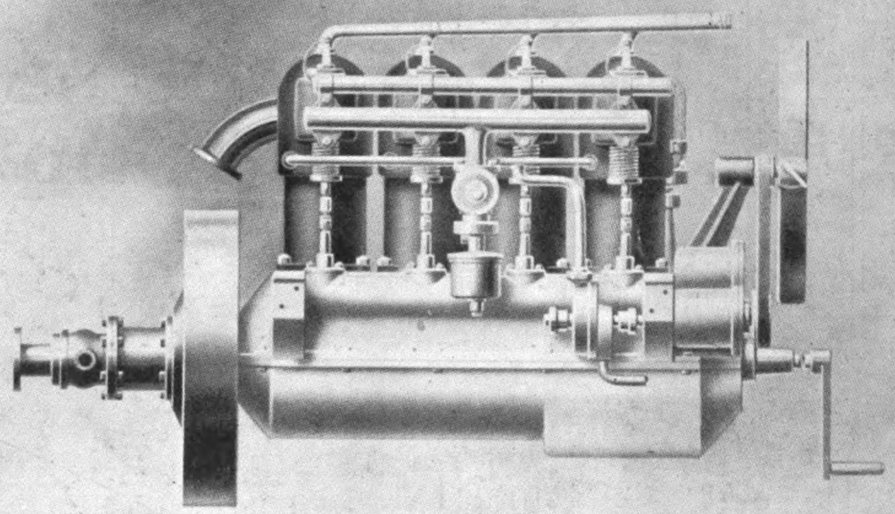
Jencick motors are simple, powerful, silent, flexible—not in promise, but in every-day performance.

SPECIFICATION OF AUTO TRUCK MOTORS

Type	No. Cyl.	Bore	Stroke	H. P.	Weight, Lbs.
A	2	4.5″	6″	12-15	350
B	4	4.5″	6″	25-30	475
C	4	5″	6.5″	40-45	565
F (Spec.)	4	6.25″	8.75″	70-80	800

Jencick Motor Corporation

PORTCHESTER, N. Y.



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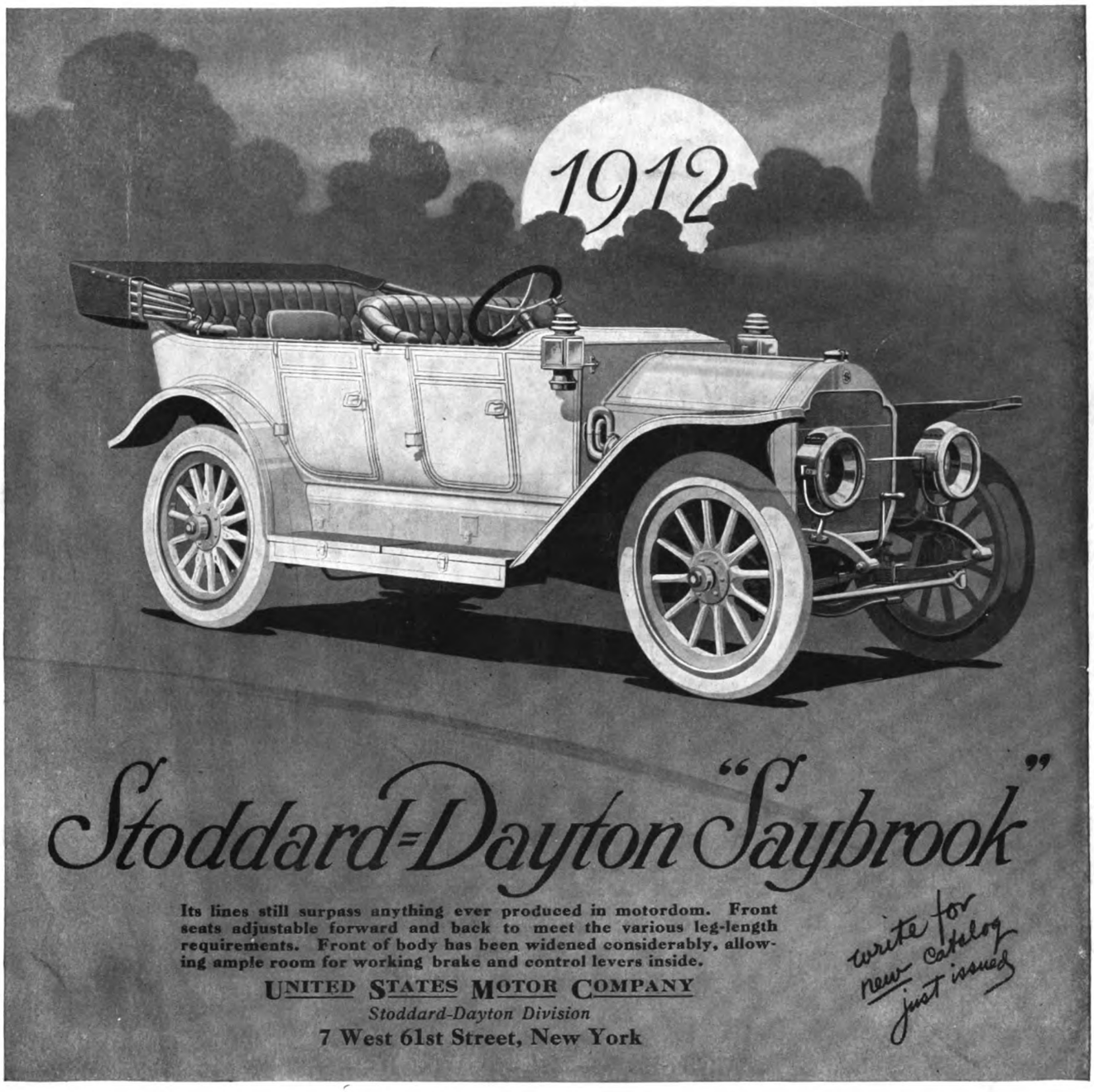
THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 6

New York, May 2, 1912

Ten cents a copy
Two dollars a year



Stoddard-Dayton "Saybrook"

Its lines still surpass anything ever produced in motordom. Front seats adjustable forward and back to meet the various leg-length requirements. Front of body has been widened considerably, allowing ample room for working brake and control levers inside.

UNITED STATES MOTOR COMPANY
Stoddard-Dayton Division
7 West 61st Street, New York

write for new catalog just issued

Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York

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MICHELIN



Red Inner Tubes

Imitated in appearance but unequalled in Quality

MICHELIN — MILLTOWN — N. J.

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THE MOTOR WORLD

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Vol. XXXI
No. 7

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NOTICE

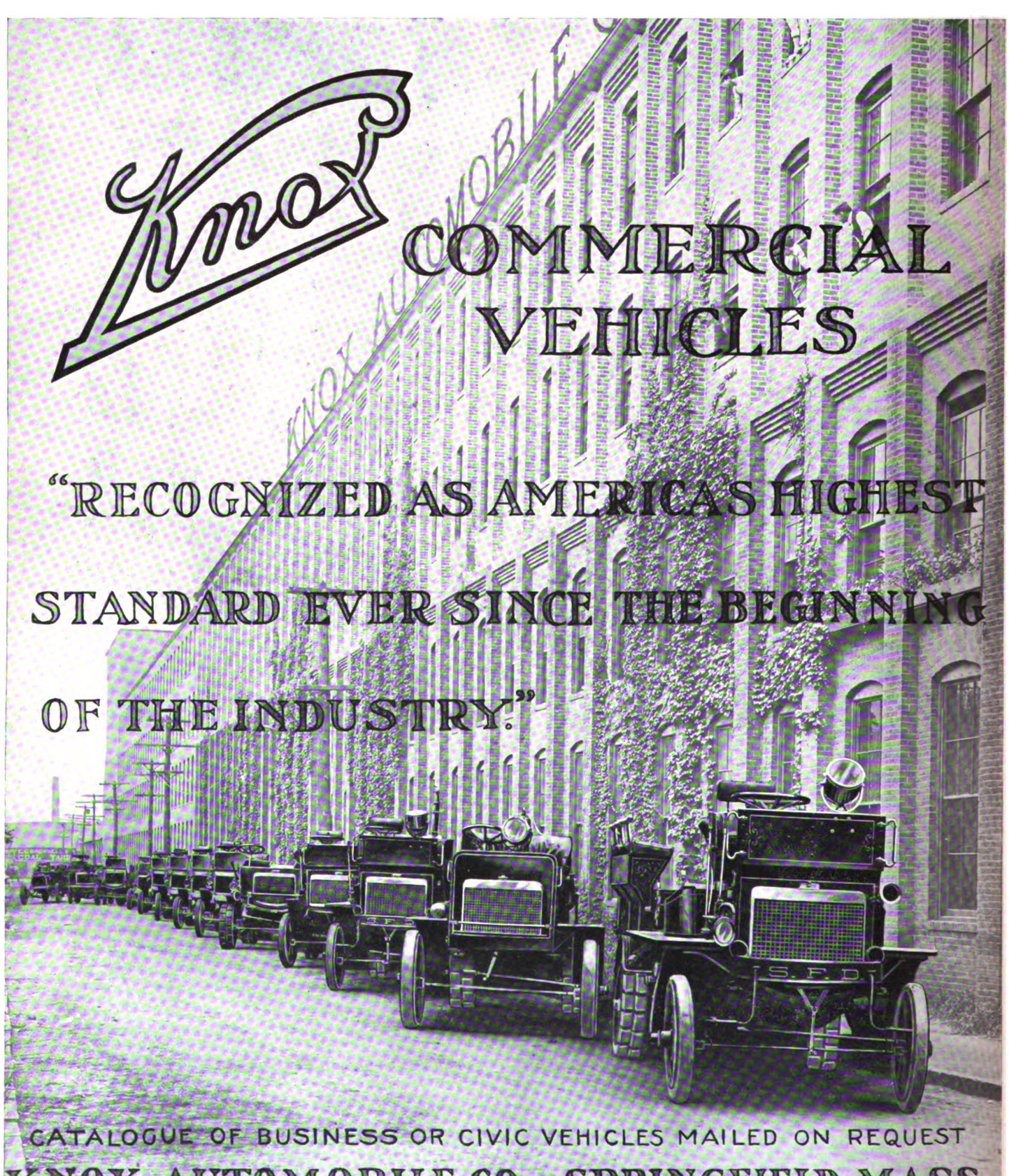
WE desire to serve notice on all persons who manufacture, sell or use Self Starters that we have patent claims covering the well known features of construction and operation of the Hanna Starter.

¶It is impossible to construct a dependable gas starter without a means of supplying the cylinders with a measured mixture of gas and air. Some are copying our method.

¶All infringers will be vigorously prosecuted!

J. H. Valentine Co.
SYRACUSE, NEW YORK

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MAY 17 1912

THE MOTOR WORLD

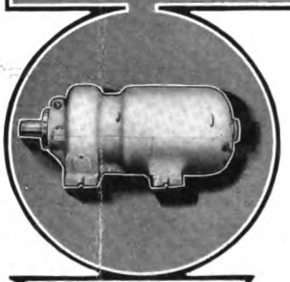
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Vol. XXXI
No. 8

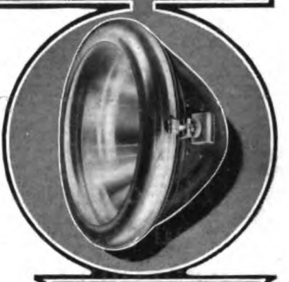
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Lighting
Dynamo System



Without doubt, the best automobile lighting system on the market.

The Most Light
A brilliancy in carrying power never before achieved, or a "dash" of light directly in front of car—as you prefer.

Constant Speed
The only system having the absolutely necessary CONSTANT SPEED feature.

Harmonious Construction
Beautifully built, like the best of automobiles. Only electrical experts are engaged in its construction.

The Luxury of It
Just turn a switch. All or part of the lamps are immediately lighted.

Its Economy
Saves recharging batteries and gas tank—unlimited current for power horn.

Four Years Experience
Proven right by years of road service—not in any sense an experimental device.

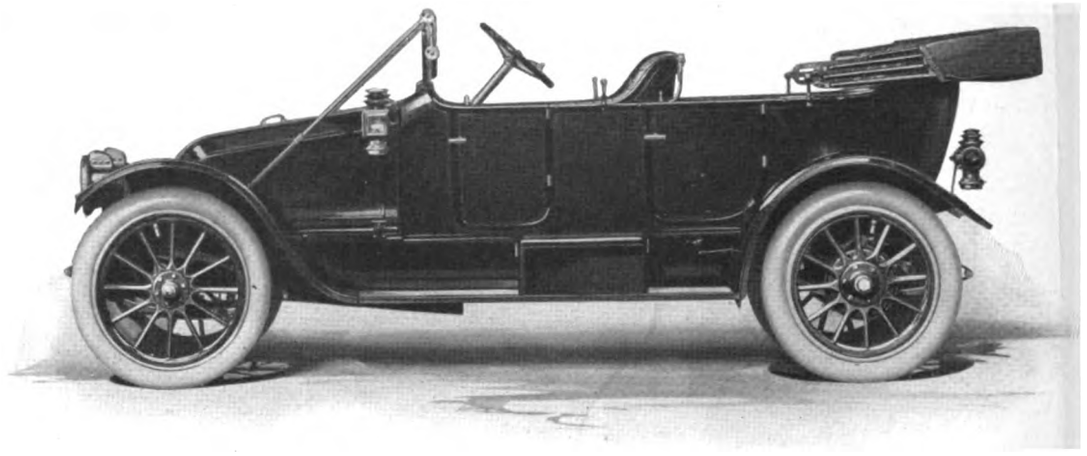
You, of course, want THIS system—'most everybody does. If you are a manufacturer, investigate before selecting any other system.

GRAY & DAVIS, Inc., 55 Lansdowne St., Boston, Mass.
Manufacturers of Automobile Lamps

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It Popularized the



"Without exception the greatest proposition ever offered."

R. C. Hamlin, Los Angeles, Calif.

The demand for the Franklin "Little Six" has not begun to be satisfied—

And the man who has made up his mind to get a Franklin "Little Six" won't have anything else. There is no other car built that will give him the same qualities.

It is a small car with a six-cylinder motor—that is what the man who drives his own car wants—a six-cylinder car that he can take care of himself without trouble—a car that does not cost heavily to run. It solves the problem of heavy up-keep.

Price twenty-eight hundred dollars at the factory.

Read What Our Dealers Say

"Write it up as strong as you want to and sign my name to it."

"Up to date I have received about fifteen of the 'Little Six' cars and I believe I am in a position to tell you what I think of them.

"It is a wonder on hills, a beautifully balanced car, extremely easy to handle and one of the best selling propositions I have had inasmuch as it supplies the demand for a reasonably small, high-powered, five-passenger touring car.

"If you desire to use my sentiments on this 'Little Six' wonder, you may write it up as strong as you want to and sign my name to it."

R. C. Hamlin
1148 South Olive Street
Los Angeles, California

"You will not be able to build them fast enough."

"The 'Little Six' satisfies me that it is the greatest proposition we have, in fact on hills it appears to have as much life as the Model D. Of course it is not as large or as roomy but it is certainly a lively car and capable of putting dust over most other sixes of much higher horse power.

"I predict that just as soon as the public realizes what a wonderful car this is, you will not be able to build them fast enough."

Charles Bilz
1432 Court Place
Denver, Colorado

"A prestige builder."

"We consider the 'Little Six' a wonderful car, and it will surely be a prestige builder for the Franklin line. Every owner of an M is highly enthusiastic over its performance."

James Sweeten, Jr.
Sweeten Automobile Company
3430 Chestnut Street
Philadelphia, Pennsylvania

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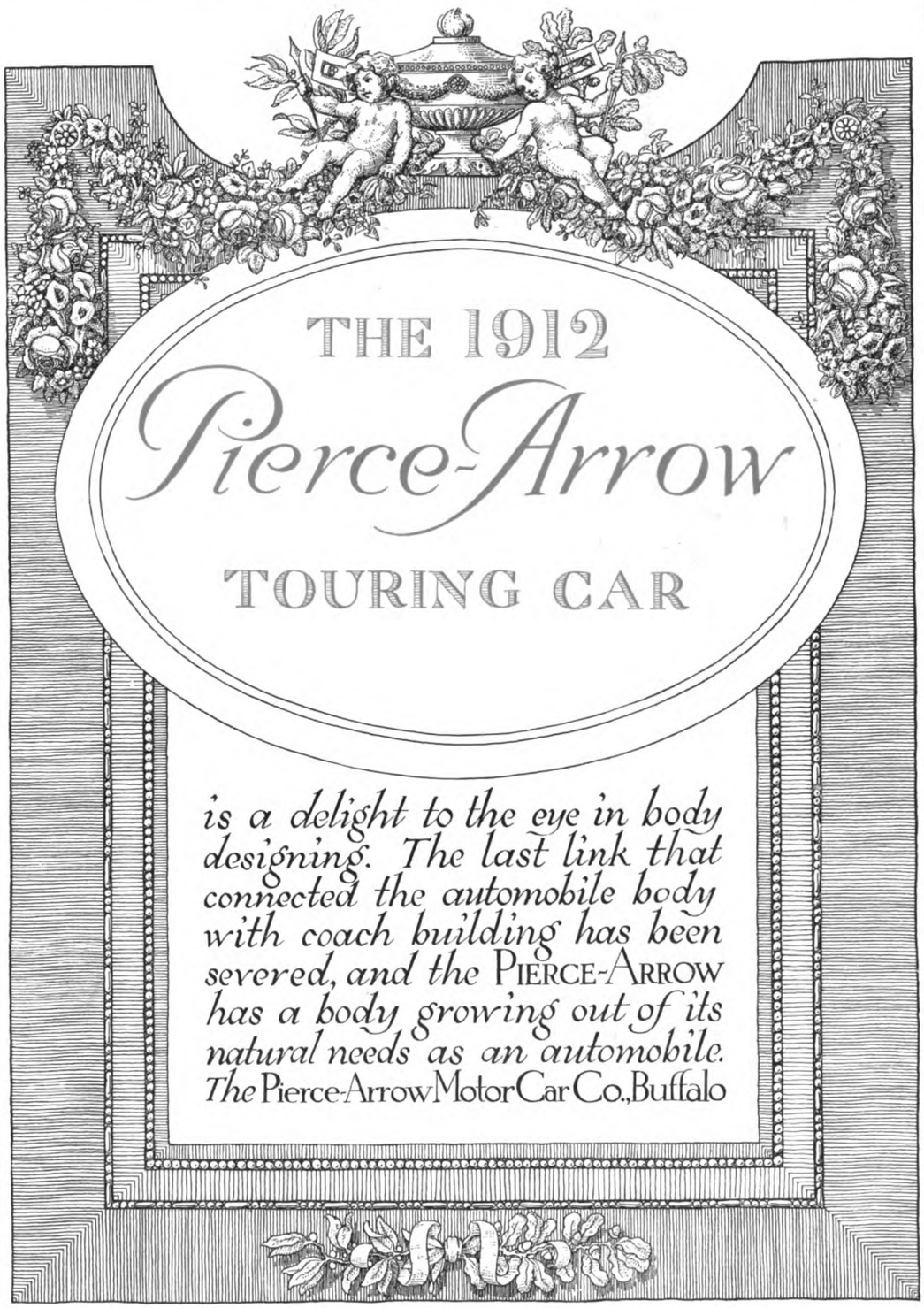
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A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 9

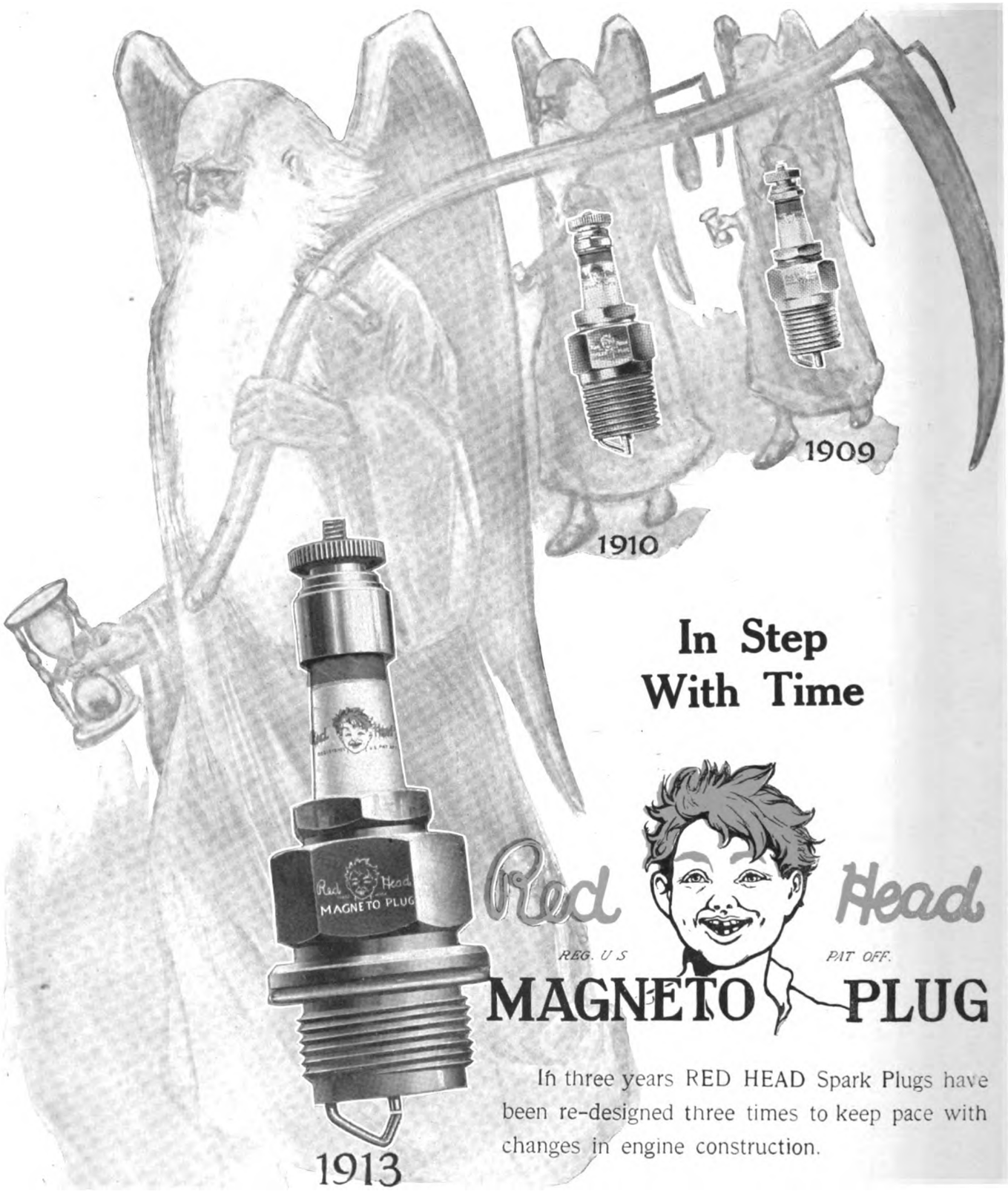
New York, May 23, 1912

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In Step With Time

Red Head

REG. U S PAT OFF.

MAGNETO PLUG

In three years RED HEAD Spark Plugs have been re-designed three times to keep pace with changes in engine construction.

From the top of the cap to the tip of the electrode the 1913 model RED HEAD is a fit mechanical companion to the triple ignition, long-stroke, high-compression Six—it is the last word in efficiency as spoken by ignition experts.

Emil Grossman Company, Manufacturer
250 W. 54th St., New York

Factory and Western Branch:
844 Woodward Avenue, Detroit

Canadian Distributor:
Hall Motor Supplies Co., 141 King Street, E. Toronto

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THE MOTOR WORLD

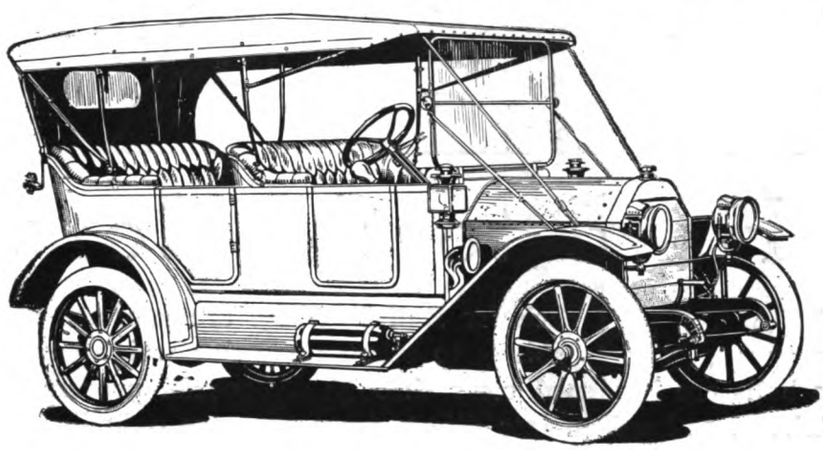
A Trade Paper Giving the World's Motor New

Vol. XXXI
No. 10

New York, May 30, 1912

Ten cents a co
Two dollars a y

The COURIER



$1150
Complete
f.o.b. Detroit

The only moderate priced car with these great advantages

You may search the entire market for another medium-price car with Courier features—and not find one. It has unusual value, as shown by those important details which most interest you.

Body—Courier bodies are spacious, deeply upholstered, finished in dark coach blue. They have flush sides, inside control, pleasing lines. You'd be glad to motor with your family in a car of the Courier's self-evident class.

Equipment—Its completeness makes Courier price all the more extraordinary. You have no expense for accessories. Your Courier has self-starter, mohair top, top boot, side curtains, windshield, gas tank and headlights, oil side and rear lamps, horn and tools.

Motor—It is a quiet running 30 h.p. motor, starting from the seat. A long stroke gives it continuous power and greater economy. It is cast en bloc, runs on ball-bearings, has thermo-syphon water cooling and dual ignition. It is simple and flexible—throttles down to mere movement and "picks up" easily and quickly. If you've ever driven another car you'll appreciate the Courier engine.

Brakes—The most important part of a motor car. Couriers have four large brakes acting directly on the rear wheels and equally effective when moving forward or backward—down hill for instance. They do not grip, but take hold smoothly and firmly. The confidence you feel when these brakes are applied is pleasant—you often do not get it in other cars—even expensive ones.

Lubrication—Courier has a perfected circulating system for the motor. Put in a gallon of oil about every 800 miles. Many grease cups are provided—on spring shackles, steering connections, and such places, and always easy to reach.

We have some territory open for hustling, established dealers.

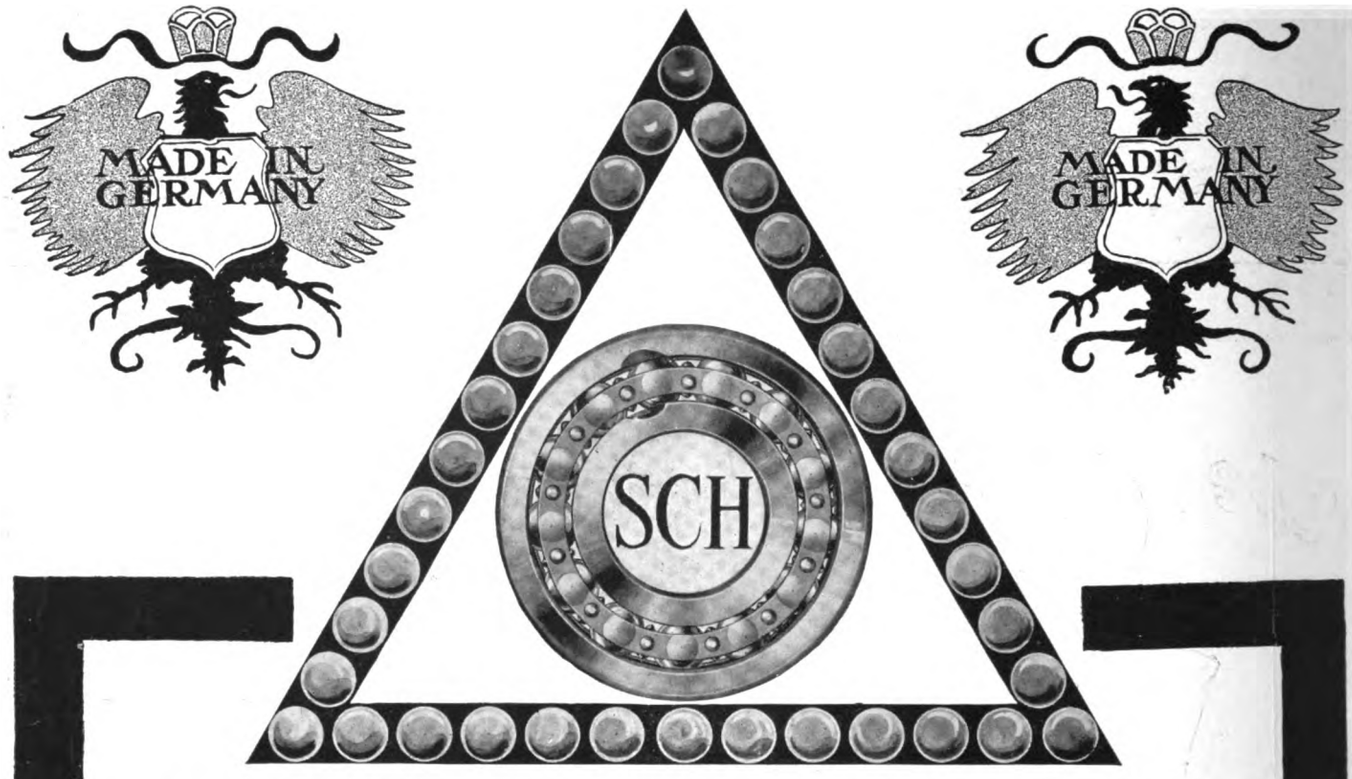
ECONOMY UNITED STATES MOTOR CO UTILITY

UNITED STATES MOTOR COMPANY

1 West 61st Street, New York

Published Weekly by The Motor World Publishing Company, 1600 Broadway, New York

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Glass Hard to the Core

THE REASON Schafer Ball Bearings are supreme in ability to stand up under weight and stress is that the balls are hardened clear through by special processes of metallurgy. The glass hard surface differs from the core only in its polish.

The Chrome Steel used in making Schafer Balls and Races is of exclusive analysis. A microscopic examination of a fragment of Schafer Bearing Steel shows a very fine texture and close grain. The processes employed by our master workmen at Schweinfurt, Germany, produce a metal of extreme structural density and great cohesive strength, practically immune from wear. The balls do not vary in size .0001 part of an inch and are of uniform texture from surface to surface.

We were first to employ 92 per cent. of balls in the raceway. Our cage design has not changed—it was correct in principle from the first, and this principle is as permanent as the laws of physics. Others have experimented with constantly varying design and the users have paid the price of these experiments. There is nothing experimental about Schafer Ball Bearings. They have been standard for years on Europe's best cars and in America are recognized as the highest grade and finest quality of anti-friction bearings, adopted by manufacturers to whom efficiency is the paramount consideration. It pays to use quality bearings.

BARTHEL, DALY & MILLER

42 Broadway, New York City

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THE MOTOR WORLD

A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 11

New York, June 6, 1912

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PENNSYLVANIA "No. 503" INNER TUBES

Designed and placed on the market to meet a distinct demand. A GOOD TUBE AT A REASONABLE PRICE.

This Tube is Guaranteed

The sound quality of our "No. 503" Inner Tube, both as to material and construction, is fully guaranteed.

Not only do these tubes satisfy the customer but they insure a fair margin of profit to the Jobber and Dealer. This is our policy at all times. It will mean profit, therefore, to write for our 1912 terms.

More than 100,000 "No. 503" Tubes have already been sold through the leading jobbers and dealers.

NOTE—Pennsylvania Vacuum Cup Tires are also backed by a definite guarantee.

NON SKID TRADE MARK REG. U.S. PAT. OFF.

Pennsylvania Rubber Company
JEANNETTE, PA.

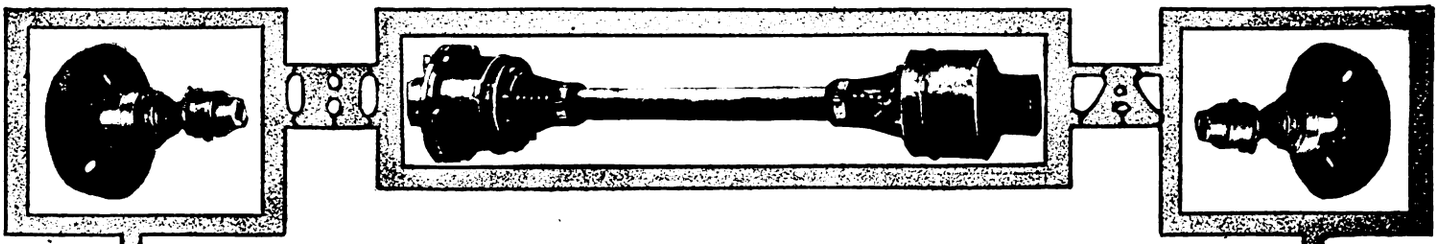
(Reorganized February 1, 1910)

Pittsburgh, 505 Liberty Ave. Chicago, 1003 Michigan Ave. Cleveland, O., 1837 Euclid Ave.
Detroit, 254 Jefferson Ave. Minneapolis, 34 S. Eighth St. Kansas City, Mo., 514 East 15th St.
PENNSYLVANIA RUBBER CO. OF NEW YORK, New York City, 1700 Broadway.
PENNSYLVANIA RUBBER CO. OF CALIFORNIA,
San Francisco, 512-514 Mission St. Los Angeles, 930 So. Main St.

An Independent Company with an Independent Selling Policy

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Hartford Universal Drives are adapted for use on every type of pleasure and commercial car, ranging from the 20 horsepower pleasure vehicle up to the highest powered racing machine and the commercial truck.

The Joint, shown here, known as Type K-700, is a masterpiece of design and construction. It has been in every Glidden Tour and endurance race of any consequence and as yet has never been penalized.



We have been making this joint equipment for five years—in that time we have never made a change in material or method of manuture.

Remember that if you are designing a car between 20 and 60 horsepower, the shaft drive detail has already been done for you—by us.

No matter what your engineering problems may be, we stand ready to help you solve them so far is they concern universal drive and clutch equipment—your specifications will receive prompt attention from our engineering department giving you service far and away beyond that which you could secure through the use of inferior and practically unknown clutches and drives.

J. S. BRETZ CO., New York, Detroit,
Sole Selling Agents.

CONE CLUTCHES

HARTFORD AUTO PARTS CO.
HARTFORD, CONN.

UNIVERSAL JOINTS

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THE MOTOR WORLD

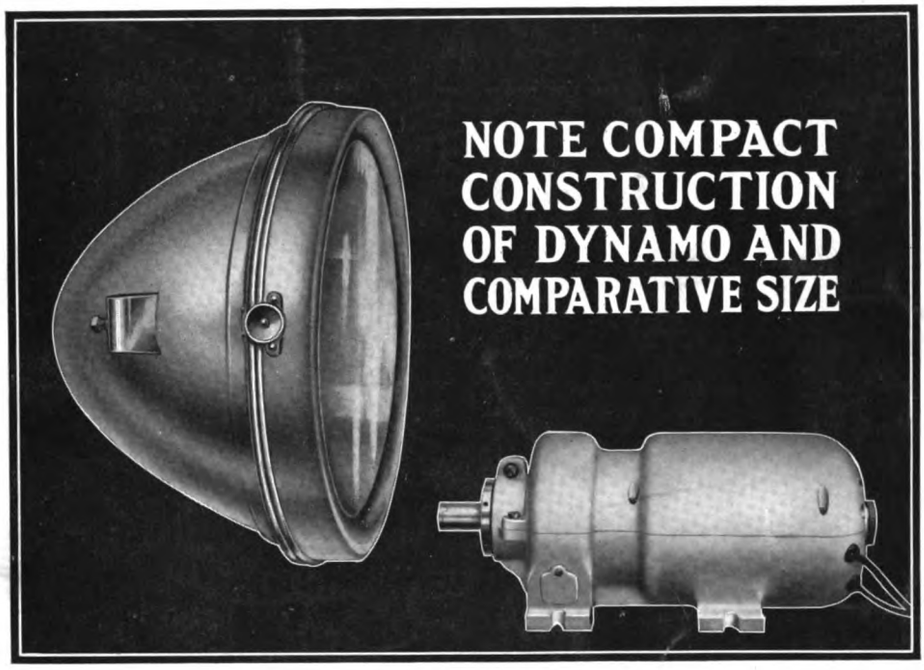
A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 12

New York, June 13, 1912

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GRAY & DAVIS
Lighting Dynamo System



Acknowledged to Be Distinctly Better Than Any Other System

The only CONSTANT SPEED machine. Absolutely reliable. Lights lamps irrespective of the battery. Operated by the motor. In service over 4 years. Standard Equipment on America's foremost cars. Ask the dealer for this system.

Write for Catalog

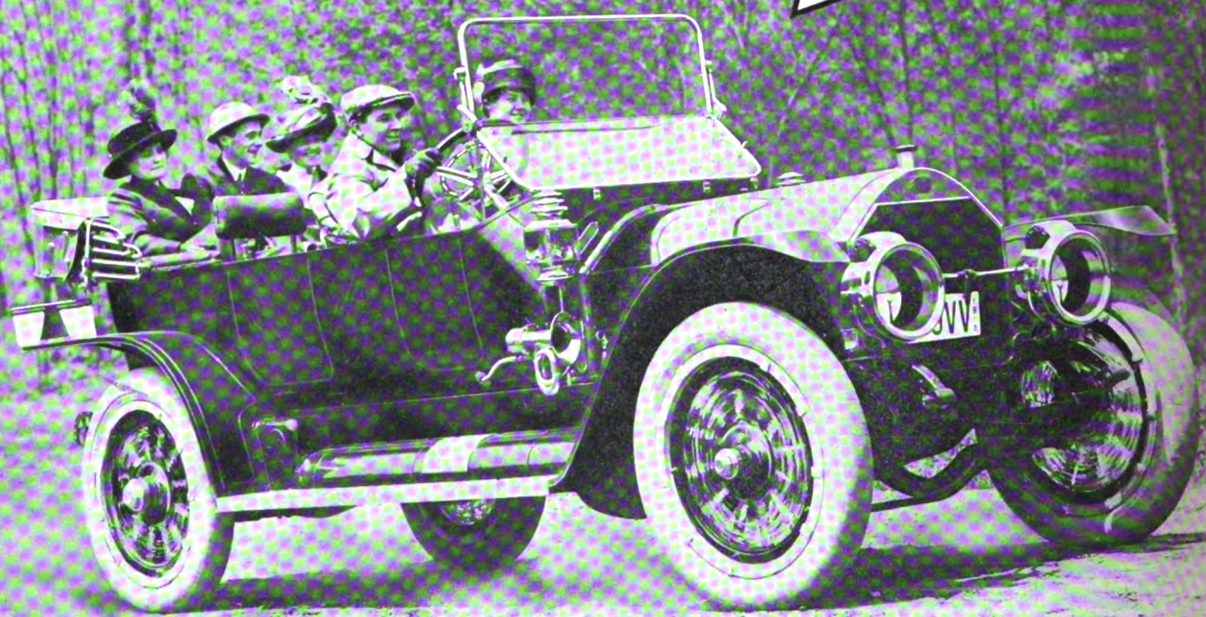
GRAY & DAVIS, Inc. Manufacturers of Automobile Lamps 55 Lansdowne Street **Boston, Mass.**

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WHY DO THEY SMILE?

IT'S A Knox



"IF YOU HAVE NEVER DRIVEN ONE UP A HILL YOU HAVE MISSED HALF THE SPORT OF MOTORING"

CATALOGUE MAILED ON REQUEST

KNOX AUTOMOBILE CO.

SPRINGFIELD, MASS.

NEW YORK BRANCHES CHICAGO

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A Trade Paper Giving the World's Motor News

Vol. XXXI
No. 13

New York, June 20, 1912

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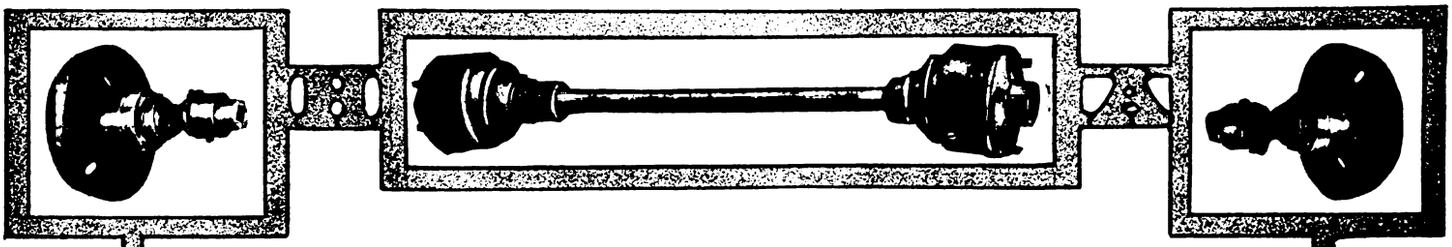
The PIERCE-ARROW Car

The man on the curb values the PIERCE-ARROW *Car for its distinction of line and elegance of finish. The man in the car itself values the* PIERCE-ARROW *for its comfort in service and absolute dependability.*

THE PIERCE-ARROW MOTOR CAR CO., BUFFALO, N.Y.

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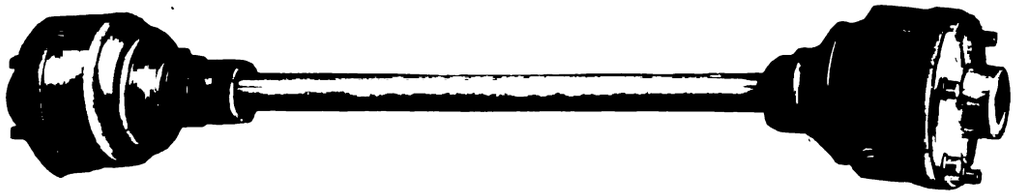
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On this page we show the detail of the Hartford Universal joint—type F-400 drive; capacity 40 horsepower.

In the construction of this joint we have allowed a liberal amount of leeway, covering by a large margin, all possibility of breakage or damage under unusual stress and strain.

The Hartford universal joints and clutches are made in the largest factory of its kind in the world. Equipped with ultra modern machinery, all manned by skilled artisans.



Here we specialize on these two important items of car construction and our experience covering a number of years has given us precedence over all other manufacturers in this line.

Wherever cars are known, Hartford clutches and universal joints are a byword—self advertised through their uniform excellence.

If you have an engineering problem in this particular, let us help you. We stand ready at all times to figure on your blue prints or to make the blue prints or your specifications.

Our prices are moderate: our deliveries prompt and general satisfaction in all of our dealings is guaranteed. Let us get acquainted.

J. S. BRETZ CO., New York, Detroit,
Sole Selling Agents.

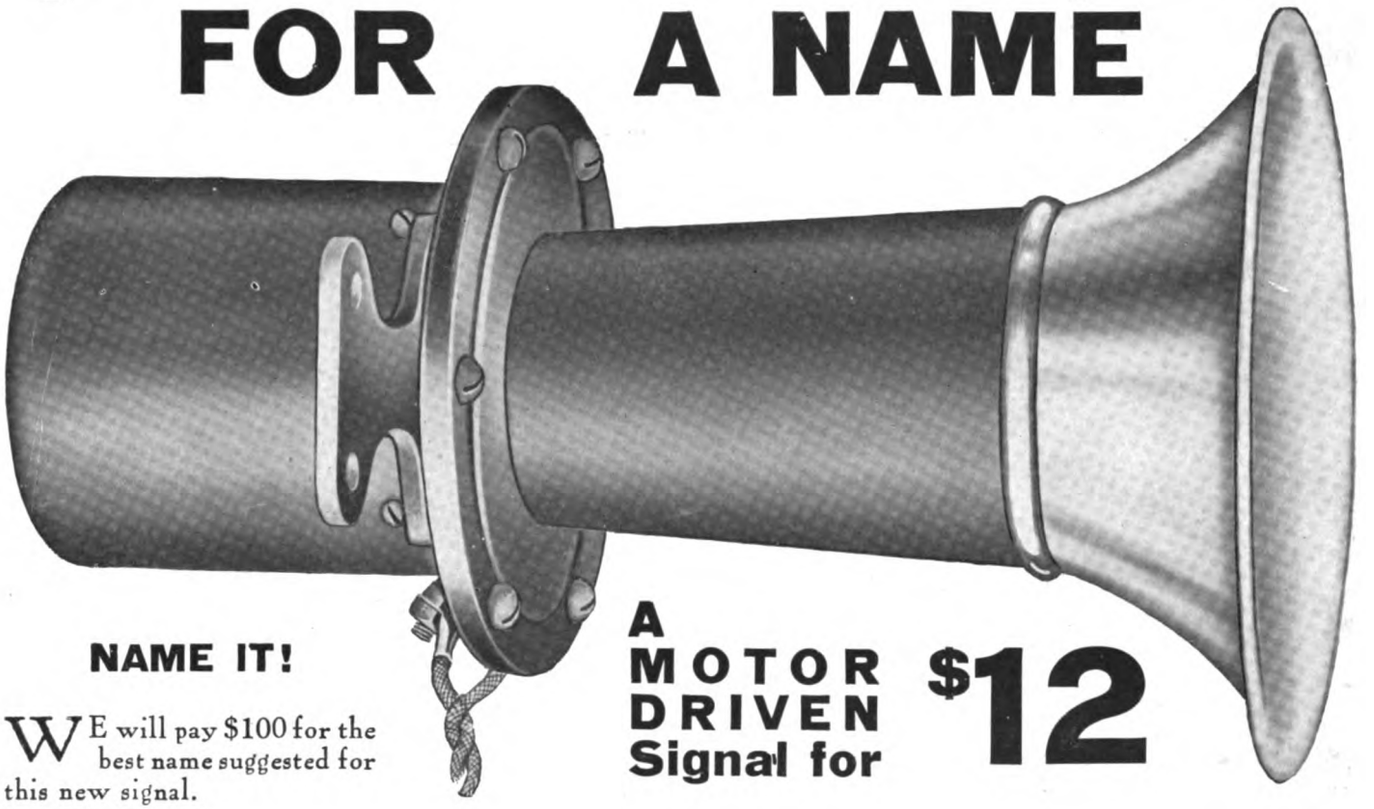
CONE CLUTCHES

HARTFORD AUTO PARTS CO.
HARTFORD, CONN.

UNIVERSAL JOINTS

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$100 FOR A NAME $100



NAME IT!

WE will pay $100 for the best name suggested for this new signal.

This offer is open until July 15th, 1912, when selection will be made.

Send in as many names as you care to.

Mark the envelope "*Name Contest*" and address to Lovell-McConnell Mfg. Company, 197 Wright Street, Newark, N. J.

Klaxon is from the Greek word "Klaxo"—*to cause to roar or shriek.*

A MOTOR DRIVEN Signal for $12

THE new signal is a little smaller than the Klaxonet.

It operates on the same principle—produces the true Klaxon warning note—and is in every way thoroughly well made and reliable.

It will be sold under the regular Klaxon and Klaxonet guarantee.

To be supplied in the following finishes: Black and Brass, Black and Nickel and all Black. All at the same price, $12,00.

Deliveries will begin September 1st, 1912. No orders accepted until August 15th.



KLAXONET

LOVELL-McCONNELL MFG. CO., Newark, N. J.

KLAXON

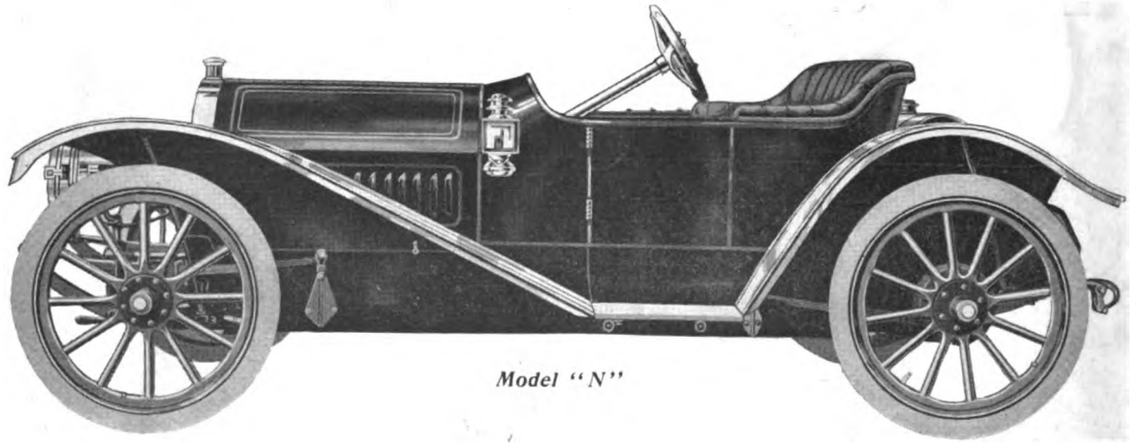
"The Public Safety Signal"



KLAXON

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A Glimpse Behind the Scenes in Selling Automobiles



Model "N"

The Famous Regal "25" Underslung Roadster $900

TWO MEN in a certain town in Kansas went into the business of selling automobiles. Year 1911. They invested about the same amount of money. Their stores were equally well placed for doing business, their experience about equal, and if you had known them personally you would have said their chances of success were equally divided.

THEY BECAME DEALERS for two different makes of motor cars. One for a well known car selling from $1500 up, the other for a well reputed line selling from $900 up. The history of their year's business is the history of the difference between exclusive, limited sales, and inclusive, unlimited sales; between slow turn-over of invested money and quick turn-over of capital invested; in other words, the difference between small volume and a few customers and large volume and many customers. One hardly paid expenses, the other dealer is fast becoming rich.

THE POINT IS—There's a moral here for hundreds of dealers. It pays big to sell a car that is as **good** or **better** for less money, that is nationally advertised, that meets popular demand, and fulfills satisfaction for the big majority—the public that composes the dealer's profit-making opportunity; for that man builds his business house upon the sand who can't say to every customer, "I believe I'm selling, not only as **good** a car as a certain sum of money can buy, but a **better** car for that price than any other car you can possibly buy."

THAT'S THE SELLING ARGUMENT, the Regal "25" "Underslung" Roadster demonstrates and sustains. Its sales prove it the best liked Roadster in the country and its advanced "Underslung" construction, beautiful lines, power, speed and equipment have captured public appreciation. Because of these advantages it is a distinctive car in any company, which, combined with this moderate price makes it the biggest seller of any Roadster now upon the market.

THE REGAL LINE IS COMPREHENSIVE. Any dealer who sells Regal cars can meet successfully any competition. He is selling highest quality; he is selling lowest price, he is selling "Underslung" construction with all its supreme advantages of safety, economy of up-keep, comfort, accessibility, beauty in design, above all, he is selling a line of cars that are in great demand because the four Regal "Underslung" Models for 1912 compliment each other to meet every man's taste and every man's pocketbook.

THEN, THERE'S REGAL SERVICE. Regal warehouses, placed at strategic points all over the country for the dealer's convenience and benefit, and his customers' convenience and benefit. The Regal factory's interest in Regal cars never ends. Every Regal dealer has a Regal warehouse near him where new cars are kept and large stocks of parts. No long waits for cars. No inconvenience for owners. Regal service means Regal Efficiency—and we're proud of this branch of our perfect organization. Regal Dealers are in a successful business—the conclusion is obvious.

SOME ROADSTER SPECIFICATIONS. Motor 25 H. P. 3¼ x 4½; Wheel base 100 inches; Magneto and Batteries (dual ignition); Transmission (Selective); Hyatt Roller Bearings throughout Transmission and Axle; Three speeds forward, one reverse; Morgan & Wright Tires 32 x 3½; Standard Equipment; Five Lamps; Generator; Horn; Complete Tool Equipment; (Folding Glass Windshield and Mohair Top and Top Boot $50 extra).

OTHER REGAL "UNDERSLUNGS"—Regal "25" Underslung Touring Car $950. (The talk of New York and Chicago Shows); the famous Regal "25" Underslung Colonial Coupe $1250. The Regal "35" Underslung Touring Car $1400.

The Regal Motor Car Co., Automobile Manufacturers Detroit, Mich.

SOME REGAL WAREHOUSES:

BOSTON—50 Washington St., Brookline.
BUFFALO—249 Delaware Ave.
CHICAGO—1502 Michigan Ave.
DALLAS—304-06 N. Akard St.
KANSAS CITY—Franklin-Hudson Ptg. Bldg., 22d and Oak Sts.
MINNEAPOLIS—1400 Hennepin Ave.
NEW YORK—136-46 W. 52nd St., Randall Bldg.
OMAHA—2209 Farnum St.
SAN FRANCISCO—720 Harrison St.

FOREIGN DEPARTMENT—18 Broadway, New York

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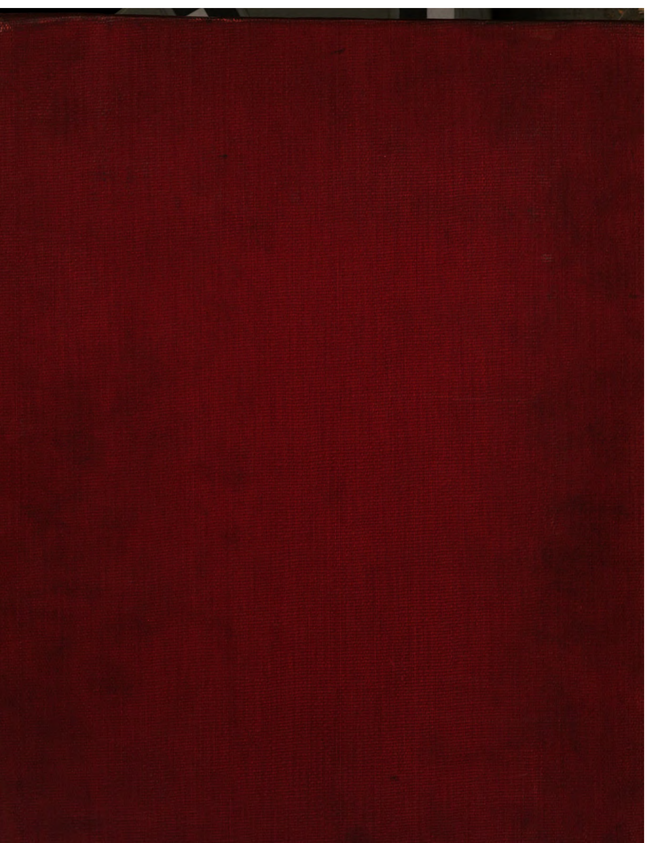
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